

CONRAC

COVINA, CALIFORNIA

A DIVISION OF CONRAC CORPORATION

CRT DATA DISPLAYS

CONRAC

COVINA, CALIFORNIA

CDF ALPHANUMERIC DISPLAY



23" CABINET
WITH CEILING MOUNT



17" CABINET



CHASSIS ONLY



14" RACK



17" RACK

Conrac's model CDF is intended for the display of alphanumeric characters when driven by a symbol generator at a refresh rate of 60 Hz. Inputs to the X and Y deflection amplifiers are low analog voltages while the Z axis (blanking) input is digital.

The CDF is a self-contained display module which includes the deflection amplifiers, blanking amplifier, yoke and CRT. The high voltage supply is fully regulated to prevent format size changes with varying character count. Input power is 115 v.a.c., 60 Hz.

To prevent phosphor burns, the Z axis amplifier is interlocked such that unblanking will not occur unless there is a minimum X and Y deflection signal at the yoke.

Character writing information may be superimposed on the coarse X and Y deflection signals. The deflection amplifiers are AC coupled. DC coupling is available.

All circuitry is solid state with the exception of a 1B3 high-voltage rectifier. Mounted on plug-in boards, the circuitry is easily modified for a number of interface requirements.

The CRT may be a 8", 9", 14", 17", 21", or 23" with any EIA registered phosphor. Plain or etched bonded safety panels are available. These tubes are electrostatically focused and electromagnetically deflected, with a 70° or 90° deflection angle, depending on size. High resolution CRT's are also available.

Standard packaging includes the following: bare chassis only, cabinets for the 17" and 23", or rack mounts for the 14" and 17" displays.

Conrac welcomes the opportunity to quote on your specific production requirements. Please contact the Sales Manager, Alphanumeric Displays.

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Specifications

Technical Data

INPUT POWER: 115 v.a.c., 60 Hz, 150 watts max.

X-Y DEFLECTION AMPLIFIER: Input—2 p-p to 6 volts p-p for full scale deflection.

Impedance—2000 ohms.

Small Signal Linear Ramp Response—typically $1\mu\text{s}$ for 0.25" screen distance on a 23", 90° deflection angle CRT.

Small Signal Sine Wave Response—3 db. down at 200 kHz.

Corner to corner retrace — $70\mu\text{s}$ including settling time on a 90° angle CRT at 14KV ultor voltage ($55\mu\text{s}$ on a 70° CRT).

Z BLANKING AMPLIFIER: Input—Digital, —2 volts to unblank, Impedance 1000 ohms.

Response—less than 200 nanoseconds.

LINEARITY: 2% of full scale, nominal. (Depends on geometric distortion of CRT selected.)

REPEATABILITY: Within a spot size.

Controls, Connectors, Adjustments

FRONT PANEL: Brightness, Focus, Horizontal Center, Horizontal Size, Vertical Center, Vertical Size, Z Duration, Z Delay, Z Test, Power On and Off.

REAR APRON: Connectors; X, Y, and Z inputs; ground and Power.

CHASSIS DECK: High Voltage adjustment.

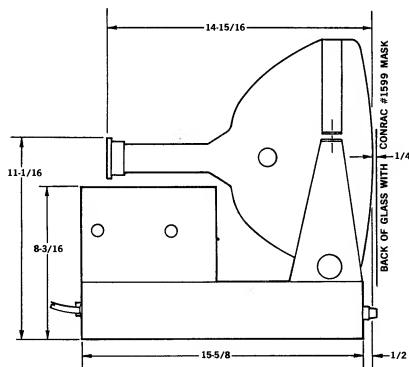
Mechanical Specifications

WEIGHTS: Bare chassis—45 pounds
17" in cabinet—89 pounds
23" in cabinet—110 pounds

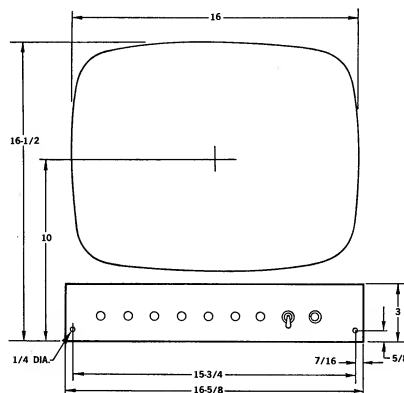
Construction

Metal cabinet — Anodized aluminum chassis — plug-in circuit boards for ease of maintenance. Copper-banded transformer — computer grade and first quality components throughout. 3-wire AC cord 6' long.

CDF17/N

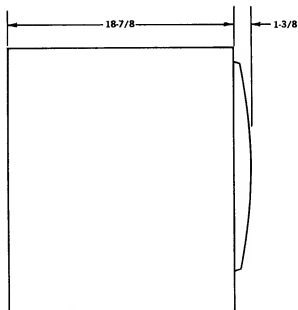


SIDE VIEW

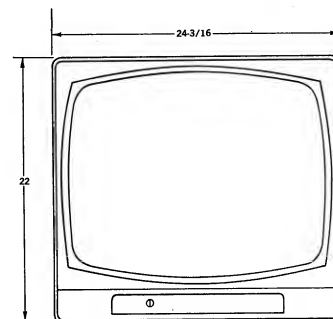


FRONT VIEW

CDF23/C



SIDE VIEW



FRONT VIEW

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CYN17, 21

RED, GREEN, BLUE

COLOR TELEVISION MONITOR



CYN17/C Color Monitor

The CYN is a compact Red, Green, Blue color monitor designed to meet rigid performance requirements while permitting operation by inexperienced personnel. Using a total of 17 vacuum tubes, 70 transistors, and 31 diodes, the CYN assures maximum stability and dependability through careful selection of the most efficient device (tube or transistor) for the circuit requirement.

Available in a 17" rack version with slides as the CYN17/RS, in a field cabinet as the CYN17/C, and as a 21" cabinet unit (CYN21/C), the color monitor permits considerable flexibility in system application. An additional model, the CYN21/Y, is equipped with mounting studs to fit available CONRAC ceiling and pedestal mounts.

While consuming only 350 watts, the CYN offers the following unique operating and design features:

TRACKING CONTRAST CONTROLS. Contrast controls for the three channels are ganged and compensated to track over the operating range, permitting simple but accurate simultaneous adjustment of the amplifiers.

BRIGHTNESS PULSES are generated within the monitor and synchronized to add to the video

signals during horizontal retrace time. The amplitudes of the brightness pulses are adjusted from a single control on the front panel, adding to the ease of operation. This advanced feature makes the CYN unique in the RGB monitor field.

COMPLETE CONTROL OF INDIVIDUAL GUNS allows the operator to turn on the beams in any combination in any desired sequence. This feature, coupled with an "operate-setup" switch and a color "on-off" control switch, makes setting up the CYN easy and rapid.

INPUT LEVEL COMPENSATION permits balance of incoming signals should slight variations occur in the transmission path.

KEYED BACK PORCH CLAMPS in each channel maintain black level accurately.

FULL ELECTRONIC REGULATION of all power supplies including picture tube filaments assures independence from line voltage variations of $\pm 10\%$.

In addition to the above features, the CYN also offers a "picture-size" switch which permits inspection of the picture edges, electrical centering controls, and a bonded shield for the kinescope for the easiest possible tube cleaning.

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Specifications

Technical Data

INPUT POWER: 350 watts at 120/240 volts, 60 Hz (525/60) or 50 Hz (625/50). Three wire line cord, 6' long with twist lock disconnect furnished.

VIDEO SIGNAL: 0.35 volts, p-p minimum composite, sync negative. 0.3 volts, p-p minimum non-composite.

VIDEO INPUT IMPEDANCE: High impedance bridging. Three sets of parallel co-ax input connectors.

SYNC: Optional operation: internal sync, external sync, or separate H and V drive. Parallel connectors for external sync 3-8 volts p-p negative, or parallel connectors for H drive and parallel connectors for V drive, 3-8 volts p-p negative.

VIDEO RESPONSE: Flat to 7 MHz on each of 3 channels.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

PRIMARY GROUP:

FRONT PANEL: Contrast, brightness, power, on-off.

SECONDARY GROUP:

FRONT PANEL: Green and blue gain; red, green and blue screens; red, green and blue on-off switches; color-monochrome selector; setup-operate; scan size; horizontal and vertical hold; vertical linearity; height; horizontal and vertical centering; focus; green and blue trim.

ADJUSTMENT, TOP FRONT PANEL: Eighteen convergence controls.

REAR APRON: Internal-external sync selector switch; internal-external H and V drive switch; remote sync relay connector; red, green and blue parallel video input connectors; sync; horizontal drive, parallel connectors; vertical drive, parallel connectors; twist lock AC connector; line fuse; AC outlet.

Tubes and Transistors

The CYN utilizes 17 tubes for power supply, regulation, deflection, and output video amplification. The kinescope is a 17ENP22 or a 21FJP22, incorporating an etched laminated safety shield. All other circuitry is solid state, employing 70 transistors and 31 diodes.

Mechanical Specifications

	Width	Height	Depth	Net Shipping	
				Weight	Weight
CYN17/C	19"	***21"	*23 $\frac{3}{4}$ "	101#	127#
CYN17/RS	19"	21"	*22-15/16"	94#	128#
CYN21/C	24"	***25-3/16"	*27-15/16"	144#	180#
CYN21/Y	26-9/16"	25-3/16"	*27-15/16"	145#	181#

*Dimension does not include handles or knobs.

**Measured to mounting surface of rack. Overall depth of unit is 23 $\frac{3}{4}$ ".

***Dimension does not include feet.

Construction

The CYN is constructed of heavy gauge aluminum while wave-soldered high grade glass-epoxy boards are used for all solid state circuits. Stranded Teflon insulated wire and first quality components are utilized. Panels and cabinets are furnished in deep umber gray.

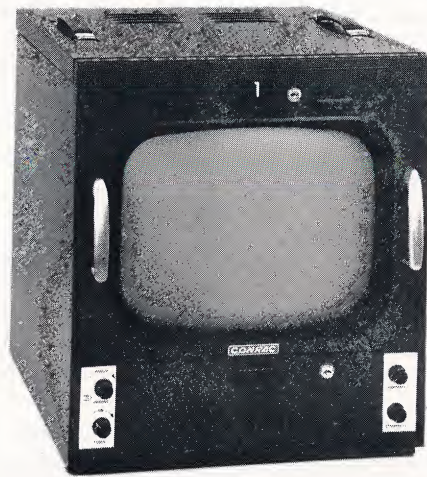
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CYB17

COLOR TELEVISION MONITOR



CYB17/C COLOR MONITOR

The CYB17 is a compact 17" professional color monitor which is available in a cabinet or for 19" rack mounting on slides.

Designed to meet rigid broadcast studio requirements, the CYB17 uses both silicon solid state and vacuum tube circuitry to obtain maximum stability and performance. A total of 17 vacuum tubes and 110 transistors are employed.

Weight is only 102 lbs., power consumption 350 watts. The CYB17/RS takes 21" of vertical rack space. The CYB17/C is a cabinet monitor, while the CYB17/Y can be suspended from the ceiling or mounted on a pedestal. The monitors offer the following unique operating and design features:

A PRECISION DECODER allows reduction in operating controls to "contrast" and "brightness" while a calibrated chroma control offers a "preset" position. Both features make the CYB17 a standard for color setup.

A DELAY LINE APERTURE CORRECTOR provides up to 10 db high-frequency boost with linear phase characteristic.

DUAL VIDEO INPUTS. A front panel selector switch with appropriate solid state switching circuitry will allow either of two video inputs to be viewed.

SOLID STATE SWITCHING replaces all mechanical relays normally found in color monitors. The sync drop relay, A-B input, the automatic bandwidth change, and the color killer are all solid state.

COMPLETE CONTROL OF INDIVIDUAL GUNS allows the operator to turn on the beams in any combination in any desired sequence. This feature coupled with an "operate-setup" switch and a color "on-off" control switch makes setting up the CYB17 easy and rapid.

A KEYED BACK PORCH CLAMP allows setup for true black level when operating on composite sync while a variable aperture corrector makes "crispening" of the picture possible. Positive interlace is assured through Conrac's patented sync gate circuitry.

In addition to the above features, the CYB17 also offers a "picture size" switch which permits inspection of the picture edges, electrical centering controls, and a bonded safety shield on the kinescope for the easiest possible tube cleaning.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 350 watts at 120/240 volts, 60 Hz (525/60 NTSC). 3-wire line cord, 6' long with twist lock disconnect furnished.

VIDEO SIGNAL: 0.25 volts, p-p minimum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: Two, high impedance bridging. Each can be terminated by an internal 75 ohm load through a switch located on rear apron.

EXTERNAL SYNC: High impedance, 1-8 volts p-p, sync negative. Parallel coax input connectors.

VIDEO RESPONSE: Flat to 5 MHz in black and white position. A 3.58 MHz trap is automatically switched in during color operation while frequencies above 3.58 MHz are rolled off. Variable aperture correction from front panel control.

LINEARITY: Within 1% of picture height.

Controls, Connectors, Adjustments

PRIMARY GROUP: Contrast, brightness, preset and manual

FRONT PANEL: chroma, power.

SECONDARY GROUP:

FRONT PANEL: Green and blue gain; red, green and blue screens; red, green and blue on-off switches; color-monochrome selector, chroma calibrate; color hold, horizontal and vertical hold; vertical linearity; height; horizontal and vertical centering; focus; scan size; setup-operate; aperture corrector; color phase; A-B input selector.

ADJUSTMENTS, TOP

FRONT PANEL: Eighteen convergence controls.

REAR APRON: Internal-external / remote sync-selector switch, remote sync relay connector, video and sync input connectors, video termination switches, twist lock AC connector, line fuse, AC outlet.

CHASSIS DECK: Four adjustments for regulating voltage, vertical feedback.

Tubes and Transistors

The CYB17 utilizes 17 tubes for power supply regulation, deflection and output video amplification. Eleven glass epoxy

circuit boards are utilized for 110 transistors. The kinescope is a 17ENP22, incorporating an etched laminated safety shield.

Mechanical Specifications

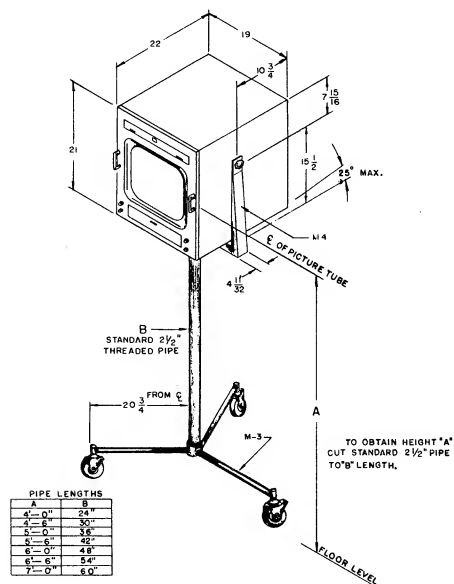
	Width	Height	Depth	Net Shipping Weight	Weight
CYB17/C	19"	21"	*23-3/4"	101#	127#
CYB17/RS	19"	21"	**22-15/16"	102#	128#
CYB17/Y	21-9/16"	21"	*23-3/4"	102#	128#
M3	3-Wheel Dolly			25#	27#
M4	Pedestal Mount			18#	25#
M5	Ceiling Mount			10#	16#

*Dimension does not include handles or knobs.

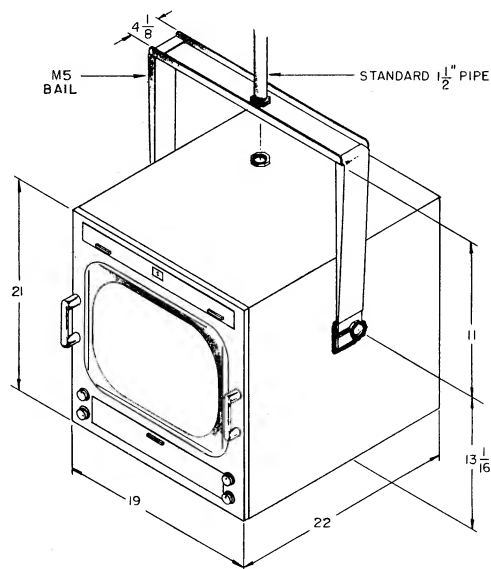
**Measured to mounting surface of rack. Overall depth of unit is 23 3/4"*. *

Construction

The CYB17 is constructed of heavy gauge aluminum while wave-soldered high grade glass-epoxy boards are used for all solid state circuits. Stranded Teflon insulated wire and first quality components are utilized. Panels and cabinets are furnished in deep umber gray.



CYB17/Y
with Pedestal Mount



CYB17/Y
with M5 Ceiling Mount

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CYB21 COLOR TELEVISION MONITOR



CYB21/C COLOR MONITOR

Designed to meet rigid broadcast studio requirements, the CYB21 professional color monitor uses both silicon solid state and vacuum tube circuitry to obtain maximum stability and performance. A total of 17 vacuum tubes and 110 transistors are employed.

Weight is only 144 lbs., power consumption 350 watts. The CYB21/C is a cabinet monitor, while the CYB21/Y can be suspended from the ceiling or mounted on a pedestal. The monitors offer the following unique operating and design features:

A PRECISION DECODER allows reduction in operating controls to "contrast" and "brightness" while a calibrated chroma control offers a "preset" position. Both features make the CYB21 a standard for color setup.

A DELAY LINE APERTURE CORRECTOR provides up to 10 db high-frequency boost with linear phase characteristic.

DUAL VIDEO INPUTS. A front panel selector switch with appropriate solid state switching circuitry will allow either of two video inputs to be viewed.

SOLID STATE SWITCHING replaces all mechanical relays normally found in color monitors. The sync drop relay, A-B input, the automatic bandwidth change, and the color killer are all solid state.

COMPLETE CONTROL OF INDIVIDUAL GUNS allows the operator to turn on the beams in any combination in any desired sequence. This feature coupled with an "operate-setup" switch and a color "on-off" control switch makes setting up the CYB21 easy and rapid.

A KEYED BACK PORCH CLAMP allows setup for true black level when operating on composite sync while a variable aperture corrector makes "crispening" of the picture possible. Positive interlace is assured through Conrac's patented sync gate circuitry.

In addition to the above features, the CYB21 also offers a "picture size" switch which permits inspection of the picture edges, electrical centering controls, and a bonded safety shield on the kinescope for the easiest possible tube cleaning.

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Specifications

Technical Data

INPUT POWER: 350 watts at 120/240 volts, 60 Hz (525/60 NTSC). 3-wire line cord, 6' long with twist lock disconnect furnished.

VIDEO SIGNAL: 0.25 volts, p-p minimum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: Two, high impedance bridging. Each can be terminated by an internal 75 ohm load through a switch located on rear apron.

EXTERNAL SYNC: High impedance, 1-8 volts p-p, sync negative. Parallel coax input connectors.

VIDEO RESPONSE: Flat to 5 MHz in black and white position. A 3.58 MHz trap is automatically switched in during color operation while frequencies above 3.58 MHz are rolled off. Variable aperture correction from front panel control.

LINEARITY: Within 1% of picture height.

Controls, Connectors, Adjustments

PRIMARY GROUP: Contrast, brightness, preset and manual

FRONT PANEL: chroma, power.

SECONDARY GROUP:

FRONT PANEL: Green and blue gain; red, green and blue screens; red, green and blue on-off switches; color-monochrome selector, chroma calibrate; color hold, horizontal and vertical hold; vertical linearity; height; horizontal and vertical centering; focus; scan size; setup-operate; aperture corrector; color phase; A-B input selector.

ADJUSTMENTS, TOP

FRONT PANEL: Eighteen convergence controls.

REAR APRON: Internal-external / remote sync-selector switch, remote sync relay connector, video and sync input connectors, video termination switches, twist lock AC connector, line fuse, AC outlet.

CHASSIS DECK: Four adjustments for regulating voltage, vertical feedback.

Tubes and Transistors

The CYB21 utilizes 17 tubes for power supply regulation, deflection and output video amplification. Eleven glass epoxy

circuit boards are utilized for 110 transistors. The kinescope is a 21FJP22, incorporating an etched laminated safety shield.

Mechanical Specifications

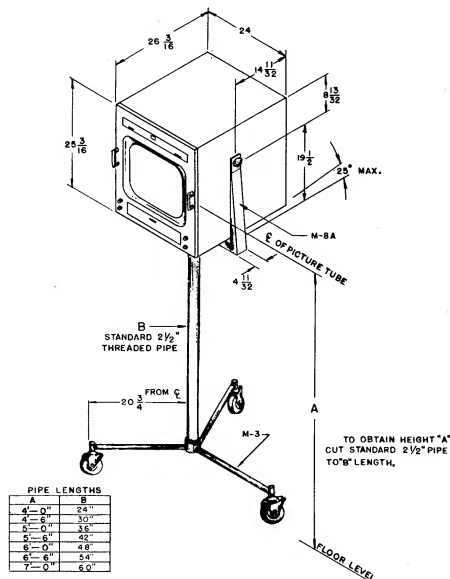
	Width	Height	Depth	Net Shipping	
				Weight	Weight
CYB21/C	24"	25-3/16"	*27-15/16"	144#	210#
CYB21/Y	26-9/16"	25-3/16"	*27-15/16"	145#	211#
CYB21/RS	24"	26-1/4"	*27-1/8"	145#	211#
M9	Ceiling Mount			10#	16#
M8	Pedestal Mount			18#	25#
M3	3-Wheel Dolly			25#	27#

*Dimension does not include handles or knobs.

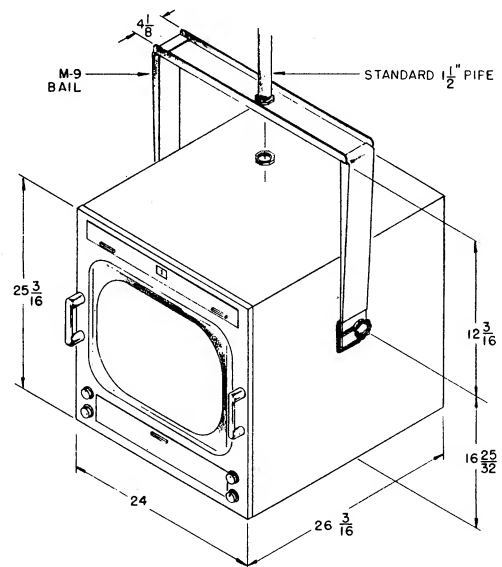
**Dimension is to mounting surface of rack. Front panel is 13/16".

Construction

The CYB21 is constructed of heavy gauge aluminum while wave-soldered high grade glass-epoxy boards are used for all solid state circuits. Stranded Teflon insulated wire and first quality components are utilized. Panels and cabinets are furnished in deep umber gray.



CYB21/Y
with Pedestal Mount



CYB21/Y
with M9 Ceiling Mount

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CEA25

25-INCH DISPLAY MONITOR



CEA25/C

Featuring both high and low voltage regulation, the CEA25 is a 25" industrial display monitor designed to give professional quality pictures in high ambient light areas.

The CEA25—created to fill a specific requirement for high contrast, stable pictures under varying line voltage conditions while operating from industrial-type synchronizing pulses—combines the following unique features:

A SEPARATE SYNC CHANNEL with an independent gain control assures positive interlace and stability regardless of the setting of the contrast control.

A RECTANGULAR, BONDED AND ETCHED SAFETY SHIELD on the picture tube minimizes specular reflections, increases the viewing angle over that possible on conventional industrial monitors and permits the most convenient picture tube cleaning possible.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ, assuring center resolution of 800

lines and corner resolution of 600 lines. Differential gain is below 5% with 50 volts driving the kinescope for excellent gray scale characteristics.

A LOCKING TRAPDOOR prevents tampering with operating controls, adjustments and fuses at unattended locations.

A DIFFERENTIAL INPUT is provided to minimize hum and other direct pick-up on long video cables. The monitor is conveniently changed between conventional grounded 75 ohm input and differential input operation by removing a single screw located on the rear apron adjacent to the input connectors.

Designed to display large, professional quality pictures in public areas where cabinet styling is important, the CEA25 utilizes a shorter 110-degree tube. Dynamic focus and increased ultor voltage assure outstanding performance on this compact large-screen monitor.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 190 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate.

VIDEO SIGNAL: 0.25 volt, p-p (minimum for 50 volts at kinescope). 4.0 volts maximum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470K in parallel with 15 pF) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz $\pm$ 1 db (800 line resolution). Differential gain below 5% with 50 volt kinescope drive.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Focus, width, brightness, horizontal linearity, horizontal hold, vertical hold, bottom linearity, top linearity, vertical size, sync, contrast, on-off switch, AC line fuse.

REAR APRON: Paralleled video input connectors, video terminating switch, paralleled sync input connectors.

CHASSIS DECK: DC restorer switch, external-internal switch, horizontal drive, horizontal frequency, B+ adjust, ultor adjust.

CONNECTORS: All video and sync connectors are SO239 type.

Tube Complement

6DJ8	1st Video—Sync Amplifier	6CG7	Vertical Oscillator—Discharge	6BK4	High Voltage Regulator
6CB6	2nd Video Amplifier	6BX7	Vertical Output	1B3GT	High Voltage Rectifier
12BY7	3rd Video Amplifier	6CG7	Horizontal Oscillator—Discharge	1N3255	(4 each) Low Voltage Rectifiers
6AL5	DC Restorer—Sync Clipper	6JB6	Horizontal Output	1N3254	Beam Clamp
12AU7	Sync—Amplifier—Phase Splitter	6DW4	Horizontal Damper	25KP4	Kinescope, frosted finish with laminated safety glass
12AU7	2nd Sync Amplifier—Sync Limiter	6080	Voltage Regulator		
6AL5	Horizontal Phase Detector	5651A	Voltage Reference		
12AX7	Vertical Integrator	6AU6	Voltage Control		

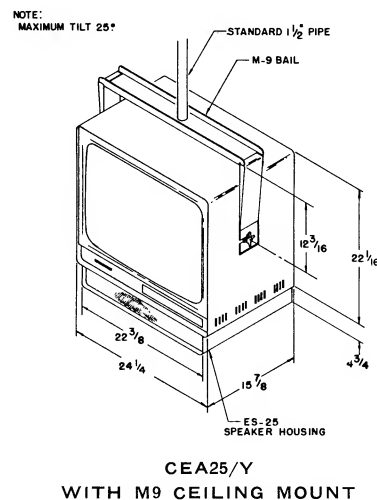
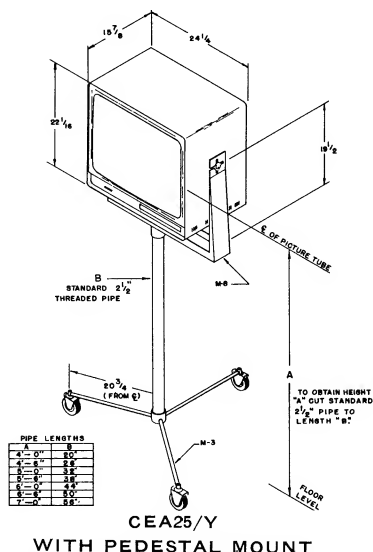
Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
CEA25/C	24 1/4"	22-1/16"	15 7/8"	104#	117#
CEA25/Y	27 1/4" (including mounting studs)	22-1/16"	15 7/8"	104#	117#
M9	Ceiling Mount			10#	16#
M8	Pedestal Mount			18#	25#
M3	Three-Wheel Dolly			25#	27#
ES25	3.2 ohm, 7.5 watt, 3 x 14 speaker			14#	20#

Construction

Metal Cabinet—18 gauge steel chassis—hand wired for ease of maintenance. Copper banded transformer—first quality resistors and capacitors throughout. 3-wire AC cord 6' long.

Finish—light gray, baked enamel.



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CVA23

23-INCH DISPLAY MONITOR



CVA23/C CABINET MONITOR



CVA23/Y WITH M9
CEILING MOUNT

Featuring both high and low voltage regulation, the CVA23 is a 23" industrial display monitor designed to give professional quality pictures in high ambient light areas.

The CVA23—created to fill a specific requirement for high contrast, stable pictures under varying line voltage conditions while operating from industrial-type synchronizing pulses—combines the following unique features:

A SEPARATE SYNC CHANNEL with an independent gain control assures positive interlace and stability regardless of the setting of the contrast control.

A RECTANGULAR, BONDED AND ETCHED SAFETY SHIELD on the picture tube minimizes specular reflections, increases the viewing angle over that possible on conventional industrial monitors and permits the most convenient picture tube cleaning possible.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ, assuring center resolution of 800 lines and corner resolution of 600 lines. Differential gain is below 5% with 50 volts driving the kinescope for excellent gray scale characteristics. The deflection circuits coupled with the longer 90-degree tube produce both horizontal and vertical linearity within 2% of picture height.

A LOCKING TRAPDOOR prevents tampering with operating controls, adjustments and fuses at unattended locations.

A DIFFERENTIAL INPUT is provided to minimize hum and other direct pick-up on long video cables. The monitor is conveniently changed between conventional grounded 75 ohm input and differential input operation by removing a single screw located on the rear apron adjacent to the input connectors.

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Specifications

Technical Data

INPUT POWER: 190 watts at 120/240 volts, 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate.

VIDEO SIGNAL: 0.25 volt, p-p (minimum for 50 volts at kinescope). 4.0 volts maximum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470K in parallel with 15 pF) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz $\pm$ 1 db (800 line resolution). Differential gain below 5% with 50 volt kinescope drive.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: On-off switch, brightness, contrast, vertical hold, horizontal hold, vertical size, vertical linearity, AC line fuse, focus.

REAR APRON: Paralleled video input connectors, video terminating switch, paralleled sync input connectors, sync level, horizontal linearity, horizontal drive, width, horizontal output fuse.

CHASSIS DECK: DC restorer switch, external - internal switch.

CONNECTORS: All video and sync connectors are SO239 type.

Tube Complement

6DJ8	1st Video—Sync Amplifier	6CG7	Vertical Oscillator—Discharge	6AU6	Voltage Control
6CB6	2nd Video Amplifier	6BL7	Vertical Output	6BK4	High Voltage Regulator
12BY7	3rd Video Amplifier	6CG7	Horizontal Oscillator—Discharge	1B3GT	High Voltage Rectifier
6AL5	DC Restorer—Sync Clipper	6DQ6	Horizontal Output	1N3255	(4 each) Low Voltage Rectifiers
12AU7	Sync—Amplifier—Phase Splitter	6AU4	Horizontal Damper	23BDP4	Kinescope, frosted finish with integral safety glass
12AU7	2nd Sync Amplifier—Sync Limiter	6080	Voltage Regulator		(Optional 23BTP4 unfrosted)
6AL5	Horizontal Phase Detector	5651A	Voltage Reference		
12AX7	Vertical Integrator				

Mechanical Specifications

WIDTH CVA23/C 24-1/4"
CVA23/Y 27-1/4" (including mounting studs)

HEIGHT 22"

DEPTH 20-1/4"

NET WEIGHT 85 lbs.

SHIPPING WEIGHT 121 lbs.

FINISH Light gray, baked enamel

Construction

Metal cabinet—16 gauge steel chassis—hand wired for ease of maintenance. Copper banded transformer—first quality resistors and capacitors throughout. 3-wire AC cord 6' long.

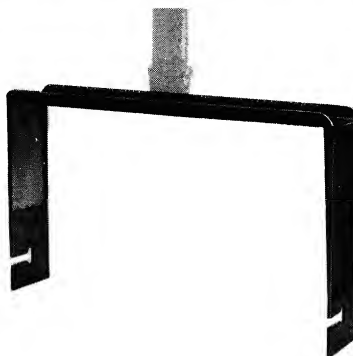
Accessories



SPEAKER ENCLOSURE ES23

A 3" x 14" extended range speaker and enclosure is available for field mounting to any CVA23 monitor.

IMPEDANCE: 3.2 ohms
POWER RATING: 7.5 watts
HEIGHT: 4-3/4"
WIDTH: 22-1/2"
DEPTH: 19"
NET WEIGHT: 15 lbs.
SHIPPING WEIGHT: 22 lbs.
FINISH: Light Gray baked enamel



CEILING MOUNT M9

The M9 Ceiling Mount is available for hanging the CVA23/Y monitor to readily available 1-1/2" steel pipe. Standard pipe fittings can be used throughout. A safety lock (not shown) secures the monitor. The center of the picture tube will locate 12" below the top of the M9 ceiling mount. The bottom of the monitor will locate 12" below the center of the tube. Add 4-3/4" when the speaker enclosure is installed.

NET WEIGHT: 10 lbs. **SHIPPING WEIGHT:** 16 lbs.



PEDESTAL MOUNT M8

The M8 Pedestal Mount permits installation of the CVA23/Y monitor and ES23 speaker on readily available 2-1/2" steel pipe. A standard 2-1/2" threaded pipe coupling is a part of the M8 mount. The center of the picture tube will be located approximately 20" above the top of the pipe when the coupling is threaded in place.

NET WEIGHT: 18 lbs. **SHIPPING WEIGHT:** 25 lbs.

CONRAC®

COVINA, CALIFORNIA

A DIVISION OF CONRAC CORPORATION

RVB17", 23"

TRANSISTORIZED UTILITY AND DISPLAY MONITORS



RVB17/C



RVB23/C

The transistorized RVB Series offers improved reliability and low power drain (less than 70 watts). It is designed to give extremely stable pictures from industrial cameras producing other than EIA sync waveshapes, and provides professional quality pictures in high ambient light areas.

FULL REGULATION assures stable pictures under adverse conditions. Size or brightness will not change as the AC line voltage varies from 105 to 130 volts at any rate. Low voltage supply utilizes conventional series regulators and high voltage supply employs unique saturable reactor with feedback loop regulation. HV is nominally 19KV and regulation within 400 volts.

DIFFERENTIAL INPUT is provided to minimize hum and other extraneous pickup on long video cables. At 5 volts 60 Hz hum suppression is 40 db minimum; greater suppression is achieved at low hum levels. The monitor is conveniently changed between conventional grounded 75 ohm input and differential input operation by removing a single screw located on the rear apron adjacent to the input connectors.

SEPARATE SYNC CHANNEL with an independent gain control assures positive interlace and stability regardless of contrast control setting.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ, assuring a center resolution of 800 lines and corner resolution of 600 lines. Differential gain less than 5% at 50 volts kinescope drive for excellent gray scale rendition. Horizontal and vertical linearity is within 2% of picture height and respective size controls do not affect linearity adjustment.

UNDERSCAN COILS are provided so that the unit may be operated at reduced scan, showing all four corners. On large raster, size can be adjusted from the front of the monitor to show raster edges when desired.

RECTANGULAR PICTURE TUBE WITH BONDED SAFETY SHIELD increases the viewing angle and permits convenient faceplate cleaning. RVB23 employs etched laminated safety shield, minimizing specular reflections, and RVB17 includes standard clear laminated safety shield.

LOCKING TRAPDOOR ON RVB23 prevents tampering with front operating controls at unattended locations.

LOOP-THROUGH OPERATION is provided by parallel receptacles in both video and external sync circuits. Video includes switch and terminating resistor. A switch is provided to permit selection of either 100% or zero DC restoration.

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Specifications

Technical Data

INPUT POWER: 65 watts at 120/240 volts, 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while the line voltage varies from 105 to 130 volts AC at any rate. 3-wire line cord, 6' long.

VIDEO SIGNAL: 0.3 volt p-p (minimum for 50 volts at kinescope), 5 volts p-p maximum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 50K in parallel with 15 pf.) can be terminated by an internal 75 ohm load ($\pm 1\%$) through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz ± 1 db. Differential gain below 5% with 75 volts kinescope drive.

DC RESTORATION: 100% or zero, sync tip clamp.

EXTERNAL SYNC: 1 to 8 volts. Parallel connectors. Monitor will operate from either composite video and sync signals or separate external composite sync.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: On-off switch, brightness, contrast, focus, vertical hold, vertical size, vertical linearity, horizontal hold, width, and AC line fuse, HV fuse.

REAR APRON: Paralleled video input connectors, video terminating switch, external-internal sync switch, paralleled sync input connectors.

TOP ADJUSTMENTS: Horizontal linearity, high voltage regulator adjustment, vertical range, vertical feedback, sync gain, DC restorer switch.

CONNECTORS: All video and sync connectors are SO239 type.

Transistors

RVB17 and RVB23 monitors utilize 32 transistors and 25 diodes on glass epoxy circuit boards. The high voltage rectifier is a 3A3.

Kinescopes

RVB17 17269P4 17" kinescope with clear laminated safety shield.

RVB23 23BDP4 23" kinescope with etched laminated safety shield.

Mechanical Specifications and Finish

	Finish	Width	Height	Depth	Net Wt.	Shipping Wt.
Chassis						
RVB17/N	None	16-5/8"	16-1/2"	16-1/8"	45#	58#
Rack Mounted						
RVB17/R	Deep umber gray.	19"	17-1/2"	17-1/2"*	59#	76#
Cabinet						
RVB17/C	Cabinet light gray. Mask and front panel black.	17-11/16"	17-3/8"**	18"	80#	91#
Bail Mount						
RVB17/Y	Cabinet light gray. Mask and front panel black.	20-11/16"***	17-3/8"**	18"	80#	91#
Cabinet						
RVB23/C	Cabinet and front panel light gray. Mask black.	24-1/4"	22"	19-1/4"	85#	121#
Bail Mount						
RVB23/Y	Cabinet and front panel light gray. Mask black.	27-1/4"***	22"	19-1/4"	85#	121#

* Mounting surface to rear edge of rack = 17-3/16".

** Does not include feet.

*** Including mounting studs.

Construction

Racks and cabinets are constructed of heavy gauge steel. Cabinets are complete with metal back and carrying handles; mounting studs with RVB17/Y and RVB23/Y. Chassis is heavy gauge aluminum. All RVB Series units are shipped with kinescope in place. Front controls are readily accessible on recessed panel with hinged cover.

Standard Accessories

ES23 Speaker Enclosure with 3" x 14" extended range speaker for RVB23.

M6 Pedestal Mount supports RVB17/Y; with 2-1/2" standard pipe fitting.

M7 Ceiling Mount suspends RVB17/Y; for 1-1/2" standard pipe fitting.

M8 Pedestal Mount similar to M6 for RVB23/Y.

M9 Ceiling Mount similar to M7 for RVB23/Y.

M3 Three-Wheel Dolly (less pipe) used with M6 or M8 Mounts to make mobile pedestal.

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WVA21"

REGULATED UTILITY MONITOR



WVA21/C CABINET MONITOR

Featuring both high and low voltage regulation the WVA is an industrial display monitor designed to give extremely stable pictures from industrial cameras producing other than EIA sync waveshapes.

Although the WVA assures a professional quality picture from standard EIA signals, it combines the following unique features which make it particularly adaptable in industrial applications:

FREEDOM FROM PICTURE BOUNCE due to rapid AC line changes between 105 and 130 volts is guaranteed by the WVA voltage regulation circuits.

A **SEPARATE SYNC CHANNEL** with an independent gain control assures positive interlace and stability regardless of setting of the contrast control.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ providing center resolution of 800 lines. Differential gain is below 5% with 50 volts driving the kinescope for excellent gray scale characteristics.

LINEARITY, both horizontal and vertical, is kept within 2% of picture height while corner resolution on the 90-degree tube is 600 lines.

A **DIFFERENTIAL INPUT** is provided to minimize hum and other direct pick-up on long video cables. The monitor is conveniently changed between conventional grounded 75 ohm input and differential input operation by removing a single screw located on the rear apron adjacent to the input connectors.

TAPS ARE PROVIDED on the horizontal output transformer so that the unit may be operated at "reduced scan", completely showing all four corners. The monitor is connected at the factory for "full scan" operation, but the change can be made in minutes in the field.

LOOP-THROUGH operation is provided by parallel receptacles in both the video and external sync circuit while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A **SWITCH IS PROVIDED** to permit selection of either 100% or zero DC restoration.

Technical data, tube complement and mechanical specifications are given on the next page.

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Specifications

Technical Data

INPUT POWER: 190 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate.

VIDEO SIGNAL: 0.25 volt, p-p (minimum for 50 volts at kinescope). 4.0 volts maximum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470K in parallel with 15 pF) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz $\pm$ 1 db (800 line resolution). Differential gain below 5% with 50 volt kinescope drive.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: On-off switch, brightness, contrast, vertical hold, horizontal hold, vertical size, vertical linearity, AC line fuse, focus.

REAR APRON: Paralleled video input connectors, video terminating switch, paralleled sync input connectors, sync gain, horizontal output fuse, horizontal linearity, horizontal drive, width.

CHASSIS DECK: DC restorer switch, external-internal switch, ultor voltage adjust, 285 volts adjust, horizontal frequency, B+ adjust.

CONNECTORS: All video and sync connectors are SO239 type.

Tube Complement

6DJ8	1st Video—Sync Amplifier	6CG7	Vertical Oscillator—Discharge	6BK4	High Voltage Regulator
6CB6	2nd Video Amplifier	6BL7	Vertical Output	1B3GT	High Voltage Rectifier
12BY7	3rd Video Amplifier	6CG7	Horizontal Oscillator—Discharge	1N3255	(4 each) Low Voltage Rectifiers
6AL5	DC Restorer—Sync Clipper	6DQ6	Horizontal Output	21CBP4	21" Kinescope
12AU7	Sync—Amplifier—Phase Splitter	6AU4	Horizontal Damper		
12AU7	2nd Sync Amplifier—Sync Limiter	6080	Voltage Regulator		
6AL5	Horizontal Phase Detector	5651A	Voltage Reference		
12AX7	Vertical Integrator	6AU6	Voltage Control		

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Chassis					
WVA21/N	20 $\frac{7}{8}$ "	20-1/16"	20 $\frac{5}{8}$ "	58#	75#
Rack Mounted					
WVA21/R	24"	22 $\frac{3}{4}$ "	21-1/8"A	102#	114#
Cabinet					
WVA21/C	24"C	21-15/16"B	24 $\frac{3}{4}$ "	125#	152#

A Dimension is to mtg. surface. Front panel 5/16".
B Dimensions do not include feet.
C Dimensions do not include handles.

Construction

Racks and cabinets are constructed of heavy gauge steel, finished in deep umber gray. Cabinets are complete with metal back and carrying handles. All WVA models are shipped with kinescope separate. Cabinet and rack mounted models have removable front panel for ease in cleaning the picture tube face and safety glass. Front controls are easily accessible from recessed panel with hinged cover. Circularly polarized laminated safety glass is available at extra cost.

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CVA17

17-INCH REGULATED UTILITY MONITOR



CVA17/C

Featuring both high and low voltage regulation, the CVA17 is a 17" industrial display monitor designed to give extremely stable pictures from industrial cameras producing other than EIA sync waveshapes.

Although the CVA17 assures a professional quality picture from standard EIA signals, it combines the following unique features which make it particularly adaptable in industrial applications:

FREEDOM FROM PICTURE BOUNCE due to rapid AC line changes between 105 and 130 volts is guaranteed by the CVA voltage regulation circuits.

A SEPARATE SYNC CHANNEL with an independent gain control assures positive interlace and stability regardless of setting of the contrast control.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ providing center resolution of 800 lines. Differential gain is below 5% with 50 volts driving the kinescope for excellent gray scale characteristics.

LINEARITY, both horizontal and vertical, is kept within 2% of picture height while corner resolution on the 90-degree tube is 600 lines.

A DIFFERENTIAL INPUT is provided to minimize hum and other direct pick-up on long video cables. The monitor is conveniently changed between conventional grounded 75 ohm input and differential input operation by removing a single screw located on the rear apron adjacent to the input connectors.

TAPS ARE PROVIDED on the horizontal output transformer so that the unit may be operated at "reduced scan", completely showing all four corners. The monitor is connected at the factory for "full scan" operation, but the change can be made in minutes in the field.

LOOP-THROUGH operation is provided by parallel receptacles in both the video and external sync circuit while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

Technical data, tube complement and mechanical specifications are given on the next page.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 190 watts at 120/240 volts, 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate.

VIDEO SIGNAL: 0.25 volt, p-p (minimum for 50 volts at kinescope), 4.0 volts maximum. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470K in parallel with 15 pF) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz $\pm$ 1 db (800 line resolution). Differential gain below 5% with 50 volt kinescope drive.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: On-off switch, brightness, contrast, vertical hold, horizontal hold, vertical size, vertical linearity, AC line fuse, focus.

REAR APRON: Paralleled video input connectors, video terminating switch, paralleled sync input connectors, sync level, horizontal linearity, horizontal drive, width, horizontal output fuse.

CHASSIS DECK: DC restorer switch, external-internal switch, Ultor voltage adjust, B+ adjust.

CONNECTORS: All video and sync connectors are SO239 type.

Tube Complement

6DJ8	1st Video—Sync Amplifier	12AX7	Vertical Integrator	5651A	Voltage Reference
6CB6	2nd Video Amplifier	6CG7	Vertical Oscillator—Discharge	6AU6	Voltage Control
12BY7	3rd Video Amplifier	6BL7	Vertical Output	6BK4	High Voltage Regulator
6AL5	DC Restorer—Sync Clipper	6CG7	Horizontal Oscillator—Discharge	1B3GT	High Voltage Rectifier
12AU7	Sync—Amplifier—Phase Splitter	6DQ6	Horizontal Output	1N3255	(4 each) Low Voltage Rectifiers
12AU7	2nd Sync Amplifier—Sync Limiter	6AU4	Horizontal Damper	17BJP4	Kinescope, 90-degree Deflection
6AL5	Horizontal Phase Detector	6080	Voltage Regulator		

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Chassis					
CVA17/N	16 $\frac{5}{8}$ "	16 $\frac{1}{2}$ "	16 $\frac{1}{8}$ "	47 lbs.	60 lbs.
Rack Mounted					
CVA17/R	19"	17 $\frac{1}{2}$ "	17 $\frac{1}{2}$ "*	61 lbs.	78 lbs.
Cabinet					
CVA17/C	17-11/16"	17 $\frac{1}{2}$ "**	17-9/16"	80 lbs.	91 lbs.

*Overall dimension, mounting surface to rear edge of rack = 17-3/16".

**Does not include handles.

***Does not include feet.

Construction

Racks and cabinets are constructed of heavy gauge steel, finished in deep umber gray. Cabinets are complete with metal back and carrying handles. All CVA17 models are shipped with kinescope in place. Cabinet and rack mounted models have removable front panel for ease in cleaning the picture tube face and safety glass. Front controls are easily accessible from recessed panel with hinged cover. Circularly polarized laminated safety glass is available at extra cost as well as cemented faceplate kinescopes. The latter eliminates the need for safety glass in front of the tube.

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CKD14

14-INCH CABINET MONITOR



CKD14

Featuring both high and low voltage regulation, the CKD14 is a 14" monitor designed for broadcast studio and industrial operation. This full regulation assures extremely stabilized pictures. Size or brightness will not change as the AC line voltage varies from 105 to 130 volts at any rate.

The CKD14 provides continuous duty operation while requiring a minimum of maintenance to keep it in top condition.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ, assuring center resolution of 800 lines. Differential gain is below 5% at 50 volts drive to the kinescope for excellent gray scale characteristics.

LINEARITY, both horizontal and vertical is within 2% of picture height. A 70-degree tube is used which assures accurate picture geometry and excellent corner focus.

TAPS ARE PROVIDED on the horizontal output transformer so that the unit may be operated

at "reduced scan", completely showing all four corners. The monitor is connected at the factory for "full scan" operation, but the change can be made in minutes in the field.

LOOP-THROUGH OPERATION is provided by parallel receptacles in both the video and external sync circuits while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

Available in a portable cabinet, the CKD14 is one of the most useful general purpose monitors designed by CONRAC for field application.

Technical data, tube complement, and mechanical specifications are given on the next page.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 180 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate. 3-wire AC cord 6' long.

VIDEO SIGNAL: 0.25 volt, p-p (minimum for 50 volts at kinescope). Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470K in parallel with 15 pF) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz $\pm$ 1 db (800 line resolution). Differential gain below 5% with 50 volt kinescope drive.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Brightness, off-on switch, horizontal hold, vertical linearity, height, vertical hold, contrast.

REAR APRON: Paralleled video input connectors, video terminating switch, DC restorer switch, external-internal sync switch, paralleled sync input connectors, ultor voltage adjust control, focus, horizontal output fuse, AC line fuse.

CHASSIS DECK: Vertical feedback horizontal drive, horizontal frequency, horizontal linearity, horizontal width, 275 voltage adjust control.

Tube Complement

6AU6	1st Video Amplifier	6BY6	Sync Separator	6DW4	Horizontal Damper
6CB6	2nd Video Amplifier	6C4	Sync Amplifier and Phase Inverter	1B3GT	High Voltage Rectifier
12BY7	3rd Video Amplifier	6AL5	Horizontal Phase Detector	6BK4	Ultor Voltage Regulator
6080	Series Regulator	6CG7	Vertical Oscillator—Discharge	1N3255	(4 each) Low Voltage Rectifiers
6AU6	Voltage Control	6AQ5	Vertical Amplifier	14BAP4	14" Kinescope
5651A	Voltage Reference	6CG7	Horizontal Oscillator—Discharge		
12AU7	External Sync Amplifier—DC Restorer	6JB6	Horizontal Amplifier		

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Cabinet					
CKD14	13-13/16"	12 1/8"*	18 5/8"	66#	73#

Dimensional drawings available on request

*This dimension does not include feet and handles.

Construction

Cabinets are constructed of heavy gauge steel, finished in deep umber gray. All CKD14 units are shipped with kinescope in place. CKD14 models have removable front panel for ease in cleaning the picture tube face and safety glass. Front controls are easily accessible from recessed panel with hinged cover. Circularly polarized laminated safety glass is available at extra cost as well as cemented faceplate kinescopes. The latter eliminates the need for safety glass in front of the tube.

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CLD14

14-INCH RACK MOUNT MONITOR



CLD14

Featuring both high and low voltage regulation, the CLD14 is a 14" monitor designed for broadcast studio and industrial operation. This full regulation assures extremely stabilized pictures. Size or brightness will not change as the AC line voltage varies from 105 to 130 volts at any rate.

The CLD14 provides continuous duty operation while requiring a minimum of maintenance to keep it in top condition.

VIDEO RESPONSE IS FLAT TO 10 MEGAHERTZ, assuring center resolution of 800 lines. Differential gain is below 5% at 50 volts drive to the kinescope for excellent gray scale characteristics.

LINEARITY, both horizontal and vertical, is within 2% of picture height. A 70-degree tube is used which assures accurate picture geometry and excellent corner focus.

TAPS ARE PROVIDED on the horizontal output transformer so that the unit may be operated

at "reduced scan," completely showing all four corners. The monitor is connected at the factory for "full scan" operation, but the change can be made in minutes in the field.

LOOP-THROUGH OPERATION is provided by parallel receptacles in both the video and external sync circuits while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

Available as a rack monitor utilizing only 10 1/2" of rack space, the CLD14 provides the ideal screen size for console viewing.

Technical data, tube complement, and mechanical specifications are given on the next page.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 180 watts at 120/240 volts, 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). 3-wire AC cord 6' long. All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate.

VIDEO SIGNAL: 0.25 volt, p-p (minimum for 50 volts at kinescope). Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470K in parallel with 15 pF) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz $\pm$ 1 db (800 line resolution). Differential gain below 5% with 50 volt kinescope drive.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Off-on switch, focus, horizontal hold, vertical hold, height, vertical linearity, contrast, brightness.

REAR APRON: Paralleled video input connectors, video terminating switch, DC restorer switch, external-internal sync switch, paralleled sync input connectors, AC line fuse, horizontal output fuse, ultor voltage adjust control, 275 voltage adjust control, AC outlet (wired through on-off switch—capacity 2 amps).

CHASSIS DECK: Vertical feedback, horizontal drive, horizontal frequency, horizontal linearity, horizontal width.

CONNECTORS: All video and sync connectors are SO239 type.

Tube Complement

6AU6	1st Video Amplifier	6BY6	Sync Separator	6DW4	Horizontal Damper
6CB6	2nd Video Amplifier	6C4	Sync Amplifier and Phase Inverter	1B3GT	High Voltage Rectifier
12BY7	3rd Video Amplifier	6AL5	Horizontal Phase Detector	6BK4	Ultor Voltage Regulator
6080	Series Regulator	6CG7	Vertical Oscillator—Discharge	1N3255	(4 each) Low Voltage Rectifiers
6AU6	Voltage Control	6AQ5	Vertical Amplifier	14BAP4	14" Kinescope
5651A	Voltage Reference	6CG7	Horizontal Oscillator—Discharge		
12AU7	External Sync Amplifier—DC Restorer	6JB6	Horizontal Amplifier		

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Rack Mounted					
CLD14	19"	10-1/2"	17-3/8"*	55 lbs.	69 lbs.

Dimensional drawings available on request

*Dimension is to mounting surface of rack. Front panel is 5/16".

Construction

Racks are constructed of heavy gauge steel, finished in deep umber gray. All CLD14 units are shipped with kinescope in place. CLD14 models have removable front panel for ease in cleaning the picture tube face and safety glass. Front controls are easily accessible from recessed panel with hinged cover. Circularly polarized laminated safety glass is available at extra cost as well as cemented faceplate kinescopes. The latter eliminates the need for safety glass in front of the tube.

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TRANSISTORIZED RKB14 14-INCH CABINET MONITOR



The transistorized RKB14 monitor offers improved reliability, low power drain (less than 65 watts), and generates a minimum of heat to affect other equipment. The RKB14 features both high and low voltage regulation assuring extremely stable pictures for broadcast and industrial applications. Size or brightness will not change as the AC line voltage varies from 105 to 130 volts at any rate.

VIDEO RESPONSE is flat to 10 MHz assuring center resolution of 800 lines and a corner resolution of 700 lines. Differential gain is below 5% at 75 volts drive to the kinescope for excellent gray scale characteristics.

LINEARITY, both horizontal and vertical, is within 2% of picture height. A 70-degree tube is used which assures accurate picture geometry and excellent corner focus.

Size of the raster can be adjusted from the front of the monitor to completely show all four sides and corners.

LOOP-THROUGH OPERATION is provided by parallel receptacles in both the video and external sync circuits while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

Available in a portable cabinet, the RKB14 is one of the most useful general purpose monitors designed by CONRAC for field application.

Technical data and mechanical specifications are given on the next page.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 65 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while the line voltage varies from 105 to 130 volts AC at any rate. 3-wire line cord, 6' long.

VIDEO SIGNAL: 0.3 volt p-p (minimum for 50 volts at kinescope). Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 50K in parallel with 15 pF) can be terminated by an internal 75 ohm load ($\pm 1\%$) through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz ± 1 db. Differential gain below 5% with 75 volts kinescope drive.

DC RESTORATION: 100% or zero, sync tip clamp.

EXTERNAL SYNC: 1 to 8 volts. Parallel connectors. Monitor will operate from either composite video and sync signals or separate external composite sync.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Off-on switch, focus, horizontal hold, vertical hold, height, vertical linearity, contrast, brightness, width.

REAR APRON: Paralleled video input connectors, video terminating switch, external-internal sync switch, paralleled sync input connectors, AC line fuse, AC outlet (wired through off-on switch — capacity 2 amps).

TOP ADJUSTMENTS: Horizontal linearity, high voltage regulator adjustment, DC restorer switch.

CONNECTORS: All video and sync connectors are SO239 type.

Transistors

The RKB14 monitor utilizes 27 transistors and 21 diodes on glass epoxy circuit boards. The high voltage rectifier is a 1B3/1G3.

14BDP4

14" kinescope with laminated safety shield.

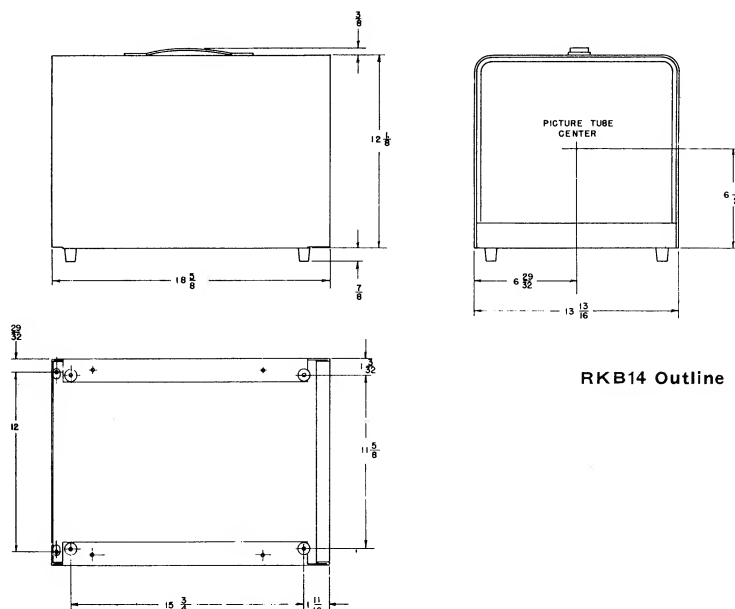
Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
RKB14	13-3/16"	12 1/8"*	18 5/8"	54#	62#

*This dimension does not include feet and handles.

Construction

Cabinets are constructed of heavy gauge steel, finished in deep umber gray. All RKB14 units are shipped with kinescope in place. Front controls are easily accessible from recessed panel with hinged cover.



RKB14 Outline Drawing

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TRANSISTORIZED RLB14 14-INCH RACK MOUNT MONITOR



RLB14

Using only 10½" of rack space while displaying an optimum 14" picture, the transistorized RLB14 monitor offers improved reliability, low power drain, (less than 65 watts), and generates a minimum of heat to affect other equipment. The RLB14 features both high and low voltage regulation assuring extremely stable pictures for broadcast and industrial applications. Size or brightness will not change as the AC line voltage varies from 105 to 130 volts at any rate.

VIDEO RESPONSE is flat to 10 MHz assuring center resolution of 800 lines and a corner resolution of 700 lines. Differential gain is below 5% at 75 volts drive to the kinescope for excellent gray scale characteristics.

LINEARITY, both horizontal and vertical, is within 2% of picture height. A 70-degree tube is used which assures accurate picture geometry and excellent corner focus.

SIZE of the raster can be adjusted from the front of the monitor to completely show all four sides and corners.

LOOP-THROUGH OPERATION is provided by parallel receptacles in both the video and external sync circuits while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

The transistorized RLB14 can mount in any console presently designed to accommodate the Conrac CLD14 since all dimensions are identical.

Technical data and mechanical specifications are given on the next page.

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COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 65 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while the line voltage varies from 105 to 130 volts AC at any rate. 3-wire line cord, 6' long.

VIDEO SIGNAL: 0.3 volt p-p (minimum for 50 volts at kinescope). Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 50K in parallel with 15 pF) can be terminated by an internal 75 ohm load ($\pm 1\%$) through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz ± 1 db. Differential gain below 5% with 75 volts kinescope drive.

DC RESTORATION: 100% or zero, sync tip clamp.

EXTERNAL SYNC: 1 to 8 volts. Parallel connectors. Monitor will operate from either composite video and sync signals or separate external composite sync.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Off-on switch, focus, horizontal hold, vertical hold, height, vertical linearity, contrast, brightness, width.

REAR APRON: Paralleled video input connectors, video terminating switch, DC restorer switch, external-internal sync switch, paralleled sync input connectors, AC line fuse, AC outlet (wired through off-on switch — capacity 2 amps).

TOP ADJUSTMENTS: Horizontal linearity, high voltage regulator adjustment.

CONNECTORS: All video and sync connectors are SO239 type.

Transistors

The RLB14 monitor utilizes 27 transistors and 21 diodes on glass epoxy circuit boards. The high voltage rectifier is a 1B3/1G3.

14BDP4

14" kinescope with laminated safety shield.

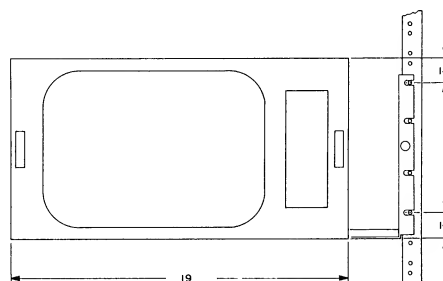
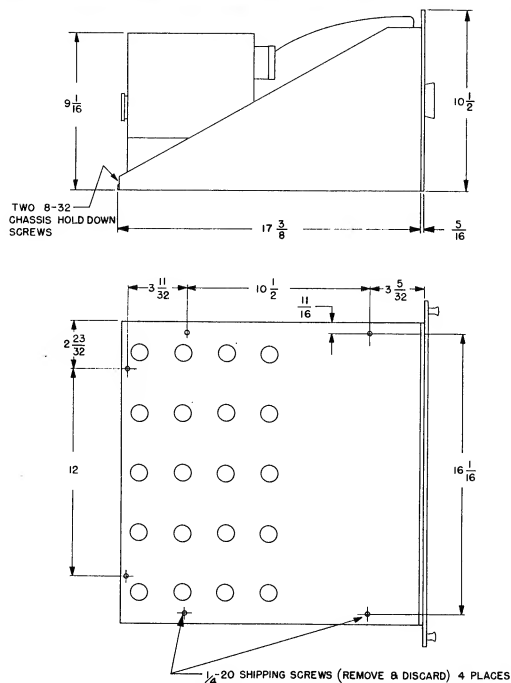
Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Rack Mounted					
RLB14	19"	10 1/2"	17 3/8"*	51#	68#

*Dimension is to mtg. surface of rack. Front panel is 5/16".

Construction

Racks are constructed of heavy gauge steel, finished in deep umber gray. All RLB14 units are shipped with kinescope in place. Front controls are easily accessible from recessed panel with hinged cover.



RLB14 Outline Drawing

NOTE: Rack slides are available for mounting directly to chassis, eliminating hanger.

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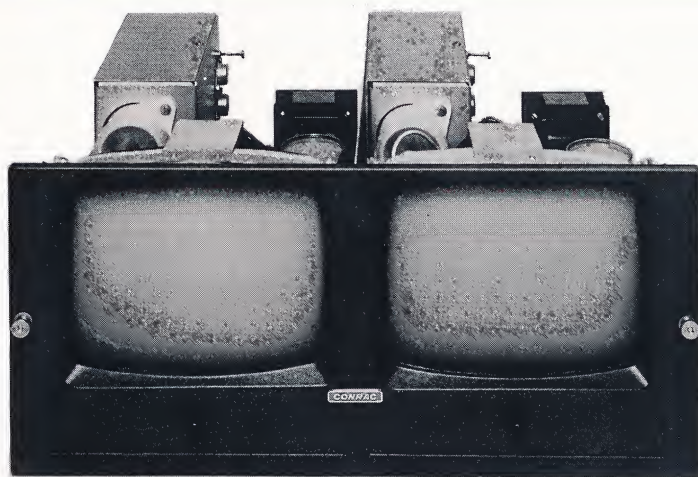
COVINA, CALIFORNIA

A DIVISION OF CONRAC CORPORATION

TRANSISTORIZED RNC9 9-INCH TELEVISION MONITOR



RNC9/C



RNC9/2R

Low power drain, minimum heat, small size, light weight, improved reliability—all possible through the use of transistors—are assured by Conrac engineering in the RNC9 television monitor. A full broadcast quality video monitor designed for continuous operation in broadcast and industrial television applications, the RNC9 features a 9" Conrac-manufactured rectangular tube. The excellent geometry and small spot size of the tube assure crisp 800 line center resolution and 700 line corner resolution.

VIDEO RESPONSE is flat to 10 MHz while differential gain is below 5% at 75 volt drive to the kinescope.

SIZE of the raster can be adjusted from the front of the monitor to completely show all four corners and sides while linearity, both horizontal and vertical, is maintained within 2% of picture height.

REGULATION of both low and high voltages provides extremely stable pictures which will

not change size or brightness as the AC voltage varies from 105 to 130 volts at any rate.

LOOP-THROUGH OPERATION is provided by parallel receptacles in both the video and external sync circuits while a switch permits selection of either composite video or separate video and composite sync. The video input is provided with a terminating resistor and switch.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

In addition to being available in a portable case with carrying handle, the RNC9 compact chassis size permits mounting two monitors side by side in a standard 19" relay rack. This assembly, model RNC9/2R, requires only 8 3/4" of vertical rack space for two independent picture presentations. Single units, mounted in 19" rack hangers, are also available with a variety of front panels to allow installation of other equipment.

Technical data and mechanical specifications are given on the next page.

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COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 65 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while the line voltage varies from 105 to 130 volts AC at any rate. 3-wire line cord, 6' long.

VIDEO SIGNAL: 0.3 volt p-p (minimum for 50 volts at kinescope). Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 50K in parallel with 15 pF) can be terminated by an internal 75 ohm load ($\pm 1\%$) through a switch located on rear apron.

VIDEO RESPONSE: 10 MHz ± 1 db. Differential gain below 5% with 75 volts kinescope drive.

DC RESTORATION: 100% or zero, sync tip clamp.

EXTERNAL SYNC: 1 to 8 volts. Parallel connectors. Monitor will operate from either composite video and sync signals or separate external composite sync.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Off-on switch, horizontal hold, vertical hold, height, vertical linearity, contrast, brightness, width, focus.

REAR APRON: Sync selector switch, video line termination switch, paralleled video input connectors, paralleled sync connectors, AC line fuse.

TOP ADJUSTMENTS: Vertical linearity, vertical hold range, DC restorer switch, high voltage regulator adjustment, horizontal linearity.

CONNECTORS: All video and sync connectors are SO239 type.

Transistors

The RNC9 monitor utilizes 28 transistors and 25 diodes on glass epoxy circuit boards. The high voltage rectifier is a 1B3/1G3.

9SP4

9" kinescope with laminated safety shield.

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Chassis					
RNC9/N	8 $\frac{1}{2}$ "	8-3/16"	14 $\frac{3}{4}$ "**	18#	29#
Portable Cabinet					
RNC9/C	9 $\frac{7}{8}$ "	9-5/16"***	15-15/16"	34#	46#
Rack Mounted					
RNC9/2R	19"	8 $\frac{3}{4}$ "	15-1/16"*	46#	61#
Rack Mounted					
RNC9/R					
(BR, BL, XR, XL)	19"	8 $\frac{3}{4}$ "	15-1/16"*	29#	41#

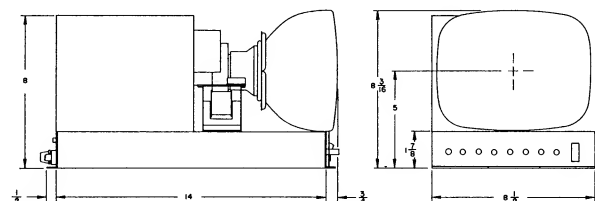
*To mtg. surface, front panel 5/16"

**Does not include knobs or connectors

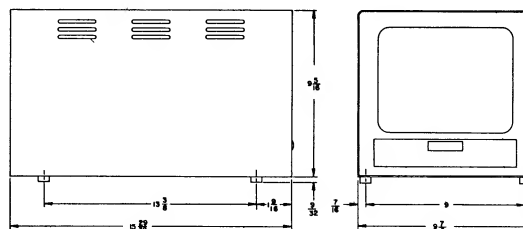
***Does not include feet

Optional Mounting Configurations

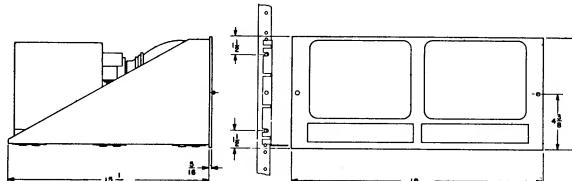
RNC9/RBL Monitor on right, blank left panel
RNC9/RBR Monitor on left, blank right panel
RNC9/RXR Monitor on left, Tektronix scope on right
RNC9/RXL Monitor on right, Tektronix scope on left
Racks and cabinets are constructed of heavy gauge steel, finished in deep umber gray. Chassis are of heavy gauge aluminum. Cabinets are complete with metal back and carrying handle. All RNC9 models are shipped with kinescope in place. Front controls are easily accessible from recessed panel with hinged cover.



RNC9/N
CHASSIS



RNC9/C



RNC9/2R

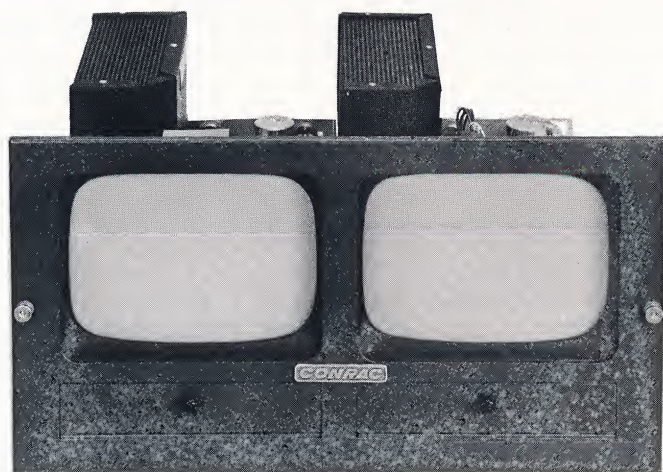
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CNB8

8-INCH TELEVISION MONITOR



CNB8/2R



CNB8/C

The Conrac CNB8 is a full-scale, broadcast quality video monitor designed for continuous duty operation in broadcast and industrial television applications.

Video response is flat to 10 MHz, allowing resolution in excess of 700 lines on standard tubes. Differential gain is below 5% at 50 volts kinescope drive for excellent gray scale characteristics. The 90-degree deflection circuits produce both horizontal and vertical linearity within 2% of picture height.

The CNB8 is connected at the factory for "full scan" operation. Taps are provided on the horizontal output transformer so that the unit may be operated at "reduced scan", com-

pletely showing all four corners and sides. A switch is provided to permit selection of either 100% or zero DC restoration. Horizontal oscillator circuits are designed to fully meet all requirements for video tape recording playback.

In addition to being available in a portable case with carrying handle, the CNB8 compact chassis size permits mounting two monitors side by side in a standard 19" relay rack. This assembly, model CNB8/2R, requires only 10½" of vertical rack space for two independent picture presentations. Single units, mounted in 19" rack hangers, are also available with a variety of front panels to allow installation of other equipment.

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Specifications

Technical Data

INPUT POWER: 130 watts at 120/240 volts, 60 Hz, (525/60 U.S.) or 50 Hz, (625/50 CCIR). 3-wire AC cord 6' long.

VIDEO SIGNAL: Composite 0.25 volts p-p (minimum for 50 volts at kinescope). 2 volts maximum. Sync negative at monitor input. Parallel co-ax input connectors for multiple operation and a line terminating resistor and switch are provided.

VIDEO RESPONSE: Flat to 10 MHz $\pm$ 1 db. Standard kinescope resolution in excess of 700 lines. Differential gain below 5% at 50 volts kinescope drive.

EXTERNAL SYNC: High impedance, 3-8 volts p-p, sync negative. Parallel input connectors.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Off-on switch, horizontal hold, vertical hold, height, vertical linearity, contrast, brightness, width.

REAR APRON: Sync selector switch, video line termination switch, DC restorer switch, horizontal linearity, horizontal drive, fuses, focus.

CHASSIS DECK: Vertical feedback.

CONNECTORS: All video and sync connectors are SO239 type.

Tube Complement

6AU6	1st Video Amplifier	6AL5	Horizontal Phase Detector	6DW4	Horizontal Damper
6CB6	2nd Video Amplifier	6CG7	Vertical Oscillator	1B3GT	High Voltage Rectifier
12BY7	3rd Video Amplifier	6AQ5	Vertical Amplifier	1N3194	(4 each) Low Voltage Rectifiers
12AU7	DC restorer, Ext. Sync Amplifier	6CG7	Horizontal Oscillator	8NP4	
6BY6	Sync Separator	6JB6	Horizontal Output	or	
6C4	Sync Amplifier and Phase Inverter			8KP4	8" Kinescope

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Chassis					
CNB8/N	8 1/2"	9 1/4"	16 3/4"***	29 lbs	39 lbs
Rack Mounted					
CNB8/2R	19"	10 1/2"	17-7/16"***	72 lbs	87 lbs
Rack Mounted					
CNB8/R	19"	10 1/2"	17-7/16"***	43 lbs	58 lbs
(XL, XR, BR, BL, C)					
Portable Cabinet					
CNB8/C	9 1/4"	9 7/8"*	18"	41 lbs	53 lbs

Dimensional drawings available on request.

* Does not include handle and feet

** Does not include knobs and connectors

*** Overall dimension—mtg. surface to rear is 17-1/8"; panel 5/16"
(Does not include knobs or connectors.)

Optional Mounting Configurations

CNB8/RBL Monitor on right, blank left panel

CNB8/RBR Monitor on left, blank right panel

CNB8/RC Monitor centered

CNB8/RXL Monitor on right, cut-out for Tektronix 529 Scope on left.

CNB8/RXR Monitor on left, cut-out for Tektronix 529 Scope on right.

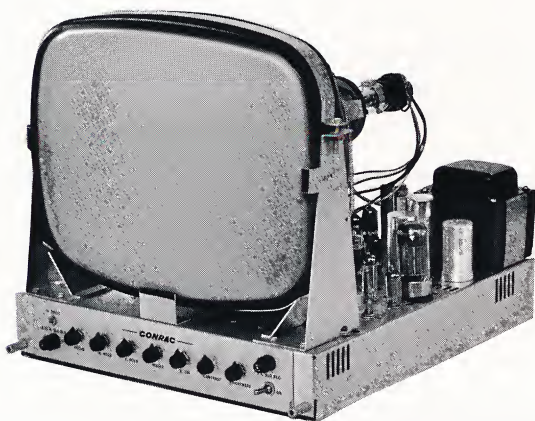
Racks and cabinets are constructed of heavy gauge steel, finished in deep umber gray. Cabinets are complete with metal back and carrying handle. All CNB8 models are shipped with kinescope in place. Cabinet and rack-mounted models have removable front panel for ease in cleaning the picture tube face and safety glass. Front controls are easily accessible from recessed panel with hinged cover. Circularly polarized laminated safety glass is available at extra cost.

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CQF14", 17", 21" HIGH RESOLUTION MONITOR



CQF17/N



CQF17/C

The Conrac model CQF high resolution monitor can be ordered for operation at 875, 945, 1029 lines at 60 field operation as a standard unit. Other horizontal scanning frequencies between 15.750 kHz and 36.450 kHz (from 525 to 1215 horizontal lines at 60 fields per second) are available on special order.

VIDEO AMPLIFIER RESPONSE is flat within ± 1 db to beyond 30 MHz. Differential gain is below 5 per cent at 50 volts kinescope drive.

HIGH RESOLUTION KINESCOPES are standard in the 14", 17" and 21" sizes. The small spot size, coupled with DYNAMIC FOCUS circuits in the monitor, assures full resolution on the entire kinescope screen.

NEARLY PERFECT INTERLACE is assured through special circuitry when scaled-up EIA sync is utilized. Excellent interlace is also possible from a wide variety of simplified "industrial" synchronization signals derived from divider-chain type sync generators. No equalizing pulses are required and a vertical sync pulse with a duration as short as two or three horizontal scanning lines is satisfactory.

ADJUSTABLE RETRACE BLANKING allows higher brightness levels without interference from retrace lines in the picture background. This is particularly valuable when the monitor is used to view X-ray images.

FREEDOM FROM PICTURE BOUNCE due to rapid AC line changes between 105 and 130 volts is guaranteed by the CQF voltage regulation circuits. Ultor voltage is regulated at 19 kV nominal.

SYNC OPTIONS permit operation of the self-contained CQF monitor (a) from a line carrying composite video and sync, or (b) from separate lines, one carrying video and one carrying composite sync. This unit is also available for operation from horizontal and vertical drive pulses, if so ordered.

A SWITCH IS PROVIDED to permit selection of either 100% or zero DC restoration.

Technical data, tube complement, and mechanical specifications for 14", 17" and 21" models are given on the next page.

CONRAC
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Specifications

Technical Data

INPUT POWER: 270 watts at 120/240 volts, 60 Hz (60 fields synchronous) or 50 Hz (50 fields synchronous). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate. 6-foot line cord furnished.

VIDEO SIGNAL: 0.5 volts, p-p for 50 volts at kinescope. Sync negative at monitor input.

VIDEO INPUT IMPEDANCE: High impedance bridging (equivalent to 470 K in parallel with 15 pF.) can be terminated by an internal 75 ohm load through a switch located on rear apron.

VIDEO RESPONSE: 30 MHz $\pm$ 1 db.

LINEARITY: Within 2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Off-on switch, focus, horizontal hold, vertical hold, height, vertical linearity, contrast, brightness, horizontal drive, fuses.

REAR APRON: Sync selector switch, video line termination switch, DC restorer switch, horizontal linearity, width, ultor adjust, horizontal and vertical blanking adjust, B+ adjust, AC outlet (wired through on-off switch—capacity 2 amps).

CHASSIS DECK: Vertical feedback, horizontal frequency, horizontal dynamic focus, interlace.

CONNECTORS: All video and sync connectors are SO239 type.

Tubes and Transistors

The CQF monitor series utilizes 22 vacuum tubes as well as 24 diodes and transistors.

Special high resolution kinescopes are manufactured by Conrac:

14171P4 14" Kinescope
17127P4 17" Kinescope
21159P4 21" Kinescope

Mechanical Specifications

	Width	Height	Depth	Net Weight	Shipping Weight
Chassis					
CQF14/N	16 $\frac{5}{8}$ "	13 $\frac{3}{8}$ "	19-13/16" A	38#	51#
Rack Mounted					
CQF14/R	19"	14"	20 $\frac{1}{2}$ " B	57#	70#
Cabinet					
CQF14/C	17 $\frac{3}{4}$ " D	14-5/16" C	20-9/16" E	74#	87#
Chassis					
CQF17/N	16 $\frac{5}{8}$ "	16 $\frac{1}{2}$ "	19-13/16" A	46#	57#
Rack Mounted					
CQF17/R	19"	17 $\frac{1}{2}$ "	20 $\frac{1}{2}$ " B	67#	83#
Cabinet					
CQF17/C	17-11/16" D	17 $\frac{1}{2}$ " C	20-9/16" E	86#	97#
Chassis					
CQF21/N	20 $\frac{7}{8}$ "	20-1/6"	23 $\frac{1}{2}$ "	57#	74#
Rack Mounted					
CQF21/R	24"	22 $\frac{3}{4}$ "	24 $\frac{1}{8}$ " F	101#	128#
Cabinet					
CQF21/C	24" D	21-15/16" C	24 $\frac{3}{4}$ " E	124#	151#

- A Face of kine to rear lip of chassis.
B Overall mounting surface to rear is 20-3/16", Panel 5/16".
C Dimension does not include feet.
D Dimension does not include handles.
E Dimension does not include knobs.
F Overall mounting surface to rear is 23-13/16", Panel 5/16".

Construction

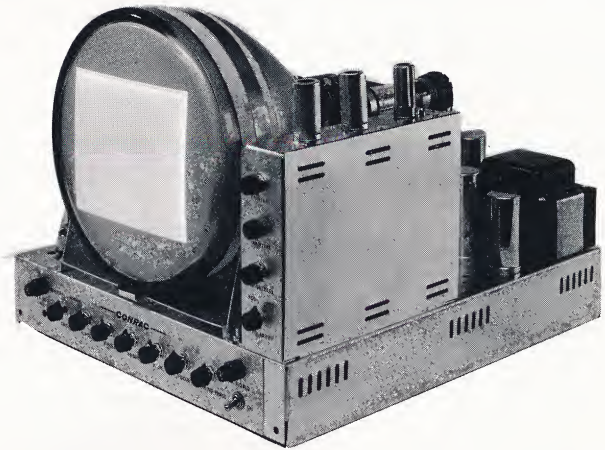
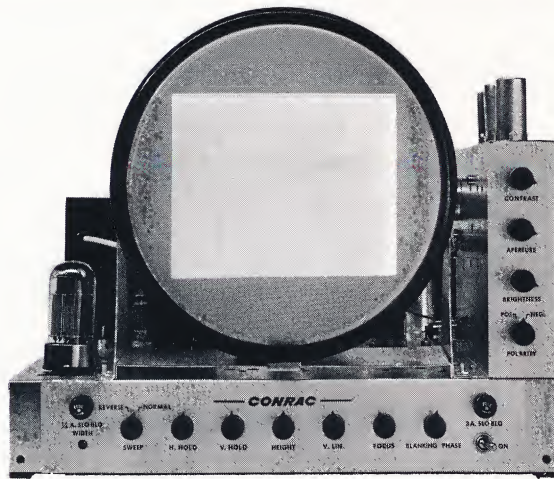
Racks and cabinets are constructed of heavy gauge steel, finished in deep umber gray. Cabinets are complete with metal back and carrying handles. CQF 14" and 17" models are shipped with kinescope in place. CQF 21" models are shipped with kinescope separate. Cabinet and rack mounted models have removable front panel for ease in cleaning the picture tube face and safety glass. Front controls are easily accessible from recessed panel with hinged cover. Circularly polarized laminated safety glass is available at extra cost as well as clear bonded faceplate kinescopes. The latter eliminates the need for safety glass in front of the tube.

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CWB10 KINESCOPE RECORDING MONITOR



CWB10/N

Designed to fill the need for a moderately priced, easy-to-operate kinescope recording monitor, the CWB10/N chassis offers many of the features found in monitors used in elaborate video-film recording systems.

ELECTRONICALLY REGULATED high and low voltage power supplies provide the stability required for professional results.

ADJUSTABLE APERTURE CORRECTION allows crispening of the picture when necessary while the 10 MHz video amplifier permits high definition recording from closed circuit sources.

SWITCHABLE PICTURE POLARITY with internal "super-blanking" for negative picture display and a HORIZONTAL SWEEP REVERSE capability permits utilization of a variety of film stocks and optical systems. Blanking pulse widths are fully adjustable.

INTERNAL BLANKING is also partially supplied when positive pictures are recorded

allowing greater than normal brightness ranges.

GEOMETRIC DISTORTION is kept to less than 1 1/2 % on a 10" round kinescope displaying a raster approximately 5 1/16" x 6 3/4".

A COMPLETELY SELF-CONTAINED UNIT, the CWB10/N monitor chassis permits simple packaging in kinescope recording systems. This single unit construction allows for rapid and easy maintenance.

ALL OPERATING CONTROLS are available on the front panels for simplicity of operation.

The CWB10/N with its ease of operation and maintenance is a highly desirable monitor for operation by semi-professional personnel, while the professional will appreciate the CWB10/N as an ideal basic chassis for use in a moderately priced video-film recording system.

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Specifications

Technical Data

INPUT POWER: 190 watts at 120/240 volts 60 Hz (525/60 U.S.) or 50 Hz (625/50 CCIR). All performance specifications will be met while line voltage varies from 105 to 130 volts AC at any rate.

VIDEO SIGNAL: 0.25 volt, p-p (maximum for 50 volts at kinescope). 2 volts maximum, sync negative.

VIDEO INPUT IMPEDANCE: High impedance for bridging; 75 ohm terminated.

VIDEO RESPONSE: Flat to 10 MHz ± 1 db.

EXTERNAL SYNC INPUT: High impedance, 3-8 volts p-p, sync negative.

LINEARITY: Within 1-1/2% of picture height.

Controls, Connectors, Adjustments

FRONT PANEL: Contrast, aperture, brightness, polarity, line fuse, horizontal fuse, off-on switch, focus, vertical linearity, height, vertical hold, horizontal hold, sweep direction, vertical feedback, width.

REAR APRON: 120 volt receptacle, 3-wire cord, loop video, internal-external sync switch, loop sync, 275 volt low voltage test, 275 volt adjustment, ultor adjustment, horizontal linearity, horizontal drive.

CHASSIS DECK: Horizontal oscillator, horizontal blanking width, vertical blanking width, H time constant (5 position switch), CCTV-Broadcast sync selector.

SUB CHASSIS: DC restorer on-off, low frequency compensation.

CONNECTORS: All video and sync connectors are SO239 type.

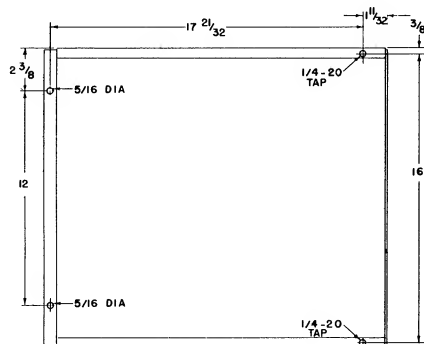
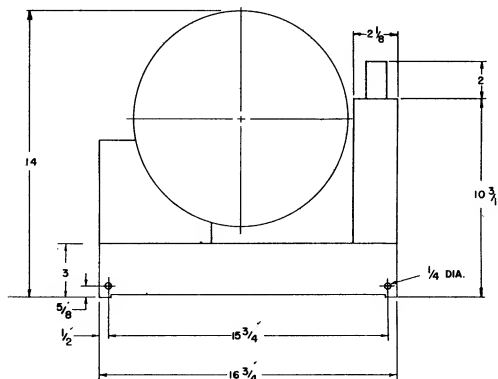
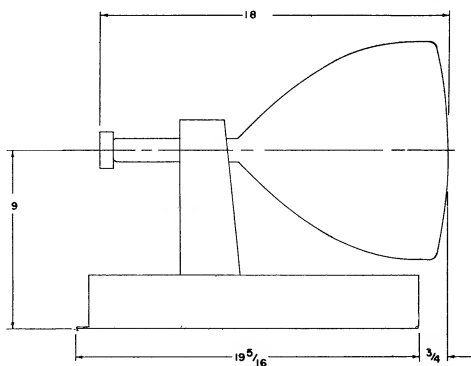
Tube Complement

6DJ8	1st Video Amplifier	6BY6	Sync Separator	2N3638	(2 each) Horizontal Blanking, Vertical Blanking
12AT7	2nd Video Amplifier	12AU7	Sync Amplifier	2N706	(6 each) Horizontal Blanking, Vertical Blanking
6CB6	3rd Video Amplifier	6AL5	Horizontal Phase Detector	6DW4	Damper
12BY7	4th Video Amplifier	12AT7	Pulse Shaper & Vertical Discharge	6BK4	Ultor Voltage Regulator
6AL5	DC Restorer	6CG7	Vertical Oscillator	6AW8	Blanking Mixer Amplifier
6080	Voltage Regulator	6AQ5	Vertical Output	1N3255	(4 each) Low Voltage Rectifiers
6AU6	Voltage Control	6CG7	Horizontal Oscillator	10164P4	Kinescope*
5651A	Voltage Reference	6JB6	Horizontal Output		
6AM8	Sync Amplifier	1B3	High Voltage Rectifier		

*Other phosphors available on special order.

Mechanical Specifications

WIDTH 16 3/4" HEIGHT 14" DEPTH 20 1/8" NET WEIGHT 50 lbs. SHIPPING WEIGHT 61 lbs.



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AV12E TELEVISION RECEIVER



AV12E

Designed for off-air monitoring, video recording or rebroadcast applications, the AV12E is a professional quality television audio-video receiver.

It supplies composite video and separate audio from modulated RF signals and is designed to accept two types of interchangeable plug-in units.

CRYSTAL CONTROLLED OPERATION is possible by insertion of the type MCU single channel plug-in unit. The antenna input network contains a bandpass filter which can be adjusted to match any given set of antenna and signal strength conditions while providing a VSWR of better than 1.2 to one.

Employing a frame grid cascode RF amplifier, a crystal controlled local oscillator, a frequency multiplier chain, and pentode mixer, the MCU provides optimum performance on any given VHF channel.

MULTI-CHANNEL OPERATION is possible by insertion of the SU-213, 12-channel plug-in turret type tuner utilizing individual VHF channel strips.

VIDEO OUTPUT is held within ± 1 db to 4.1 MHz. Bifilar-T traps are employed to reduce phase distortion.

OVER 60 DB OF SOUND ATTENUATION in the video channel is possible through a combination "split-off sound" and "inter-carrier sound" circuitry. At the same time, the 4.5 MHz sound converter operates at an optimum ratio of sound carrier to picture carrier level. Both a fast time-constant limiter and a ratio detector are employed.

VIDEO OUTPUT of up to 1.5 volts p-p into a 75 ohm load with extremely low distortion is possible through utilization of a totem pole amplifier.

4.5 MEGAHERTZ SOUND REINSERTION is available at no extra charge if this operation is specified at the time the receiver is ordered. 75 ohm input is standard unless a 300 ohm input is specified.

Technical data, tube complement and mechanical specifications are given on the next page.

CONRAC®

COVINA, CALIFORNIA

Specifications

Technical Data

INPUT POWER: 120 watts at 120/240 volts AC, 50/60 Hz. 6-foot cord.

RF: VHF 2-13, 75 ohms unbalanced. Can be supplied for 300 ohm balanced input if specified at time of ordering.

VIDEO OUTPUT: Sync negative. Nominally 1.4 volts p-p. Adjustable. Additional connector available for local monitoring. SO239 type connectors.

AUDIO OUTPUT: Zero dbm, 600 ohms balanced. Peerless output transformer, screw terminals. The unit is shipped with the multi-tap audio output transformer connected to feed standard 600 ohm balanced lines. Can be reconnected for other commonly used impedances.

Controls, Connectors, Adjustments

FRONT PANEL: Video level, audio level, RF gain, AGC selector and power switch, (channel selector and fine tuning on SU-213), AGC delay, detector level.

REAR APRON: Antenna input, fuse, detector level, video output, audio output.

Tube Complement

6BZ6	(3 each) IF Amplifiers	6BY6	Sync Separator	6CG8	Mixer
6CB6	IF Amplifier	6AL5	AGC Clamp and Bias Rectifier	6CG8	Crystal Oscillator and Frequency Multiplier
6AQ5	1st Video Amplifier	6AU6	AGC Keyer	6BN4	2nd Frequency Multiplier (Channels 7-13 only)
6DJ8	2nd Video Amplifier	6AQ5	Keying Pulse Amplifier	SU-213	
5687	3rd Video Amplifier	OA2	Voltage Regulator	6HA5	RF Amplifier
6AN8	1st Sound IF Amplifier	1N1764	(2 each) Low Voltage Rectifiers	6GJ7	Mixer
6AU6	2nd Sound IF Amplifier	1N60	Video Detector		
6AL5	Sound Detector	MCU CONVERTER			
6DJ8	Push-Pull Audio Output	ECC88	Cascode RF Amplifier		

Mechanical Specifications

Furnished in rack hanger for mounting in standard 19" rack, 7" high, 12-1/16" deep, measured from the mounting face of the rack.

Available on slides at additional cost. Specify depth of rack.

Net Weight: 28 lbs.

Shipping Weight: 42 lbs.

Construction

Finished in deep umber gray, baked enamel.



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COVINA, CALIFORNIA

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ERL MULTIPLE MONITOR CONTROL RECEIVER



ERL12A



ERL82A/R

The ERL multiple monitor control receiver allows single location control of both picture and sound for any large grouping of local monitors. Selection of any RF channel available off-the-air or on a TV distribution system is as easy as operating a home television receiver. Designed to permit simplified addition of RF channels to a high resolution video closed circuit installation, the control receiver features a switch on the front panel which changes the signal fed to all monitors from "broadcast" to "CCTV".

Available for mounting in a cabinet, or for placing on a desk, the ERL control receiver offers the following features:

VHF and UHF MODELS — The ERL12A covers channels 2-13 with a switchable plug-in coil tuner while the ERL82A covers both UHF and VHF by making use of an internally added continuous UHF tuner. The VHF model is equipped with a 75 ohm coaxial input for use with TV distribution systems and is completely shielded to minimize direct pick-up. The UHF model features the same VHF coaxial input, but provides a balanced 300 ohm input for a UHF antenna.

A BUILT-IN VIDEO DISTRIBUTION AMPLIFIER is utilized as the ERL output to permit distribution of 10 MHz video signals. Two outputs and a looping video input controlled by a separate gain control allow use of the ERL with any high quality closed circuit video source. The ERL input is installed in a video line in exactly the same manner as any video monitor.

LOCALLY ORIGINATED AUDIO is also switched into the system to replace the off-air audio when the operation switch is on "closed circuit". This permits control of sound as well as control of pictures.

A FOUR POSITION AUDIO RESPONSE control is operative in both modes while 2.5 watts of undistorted audio is available for monitoring purposes. The control receiver also provides a low impedance output for driving an external audio power amplifier. This feature permits proper interconnection between the ERL and any custom engineered sound system.

The simplified block diagram on the reverse side will be of value to the systems designer since it shows the ERL inputs and outputs in relation to internal switching and amplifying functions.

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Specifications

Technical Data

INPUT POWER: 85 watts at 110/120 volts, 60 Hz. 3-wire AC cord 6' long.

RF SIGNAL: VHF 2-13, 75 ohms unbalanced.
UHF 300 ohms balanced (Model ERL82A only).

IF SIGNAL: Picture Carrier 45.75 MHz, Sound Carrier, 41.25 MHz, Intercarrier Sound 4.5 MHz.

VIDEO SIGNAL: Input minimum 0.25 volts p-p for 0.25 volts p-p at each of two isolated outputs. Recommended input 1.0-2.0 volts p-p for 0-1.0/2.0 volts p-p controlled at each of two outputs. Sync negative in and out.

VIDEO INPUT: High impedance bridging (equivalent to 470K in parallel with 15 pF) must be terminated by an external 75 ohm load.

VIDEO RESPONSE Closed circuit 10 MHz $\pm$ 1 db, off-air 3.75 MHz through 10 MHz output DA.

AUDIO SIGNAL: Input 1 volt minimum high impedance single ended. Output cathode follower 1 volt minimum. Additional local monitoring output 2.5 watts undistorted at 3.2 or 16 ohms.

AUDIO RESPONSE: 100-20,000 Hz in normal position. Snap switch response selector provides "speech", "bass", and "treble" responses as well as "normal".

Controls, Connectors, Adjustments

FRONT PANEL: Preset fine tuning, station selector (VHF), station selector (UHF) model ERL82A only, power on-off, audio level, audio response, source selector, video level (broadcast), video level (CCTV).

REAR APRON: AGC adjust, AC input line cord, AC output (2 amps maximum) controlled by on-off switch, 3.2 or 16 ohm speaker terminals; audio output (cathode follower), video outputs (two), video inputs (two), looping. All video connectors SO239 type.

ANT. INPUTS: VHF (SO239 type), UHF 300 ohm balanced.

Tube Complement

6GM6	1st Video IF	6AU6	2nd Sound IF	6DJ8	CCTV Video Amplifier
6GM6	2nd Video IF	6BN8	Sound Detector—1st Audio	6DJ8	Video Output
6AM8	3rd Video IF—AGC Clamp	6GK6	Audio Output	1N3255	(2 each) Silicon Rectifiers
6AN8	Detector—1st Sound IF	12AT7	AGC Amplifier		Tuner—Standard Kollsman

Mechanical Specifications

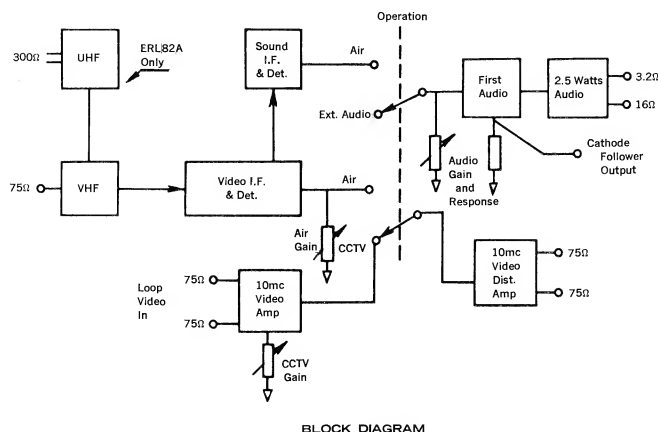
	Width	Height	Depth	Net Weight	Shipping Weight
ERL12A-ERL82A	16-3/16"	6-1/4"	*10-1/16"	22 lbs.	30 lbs.
ERL12A/R-ERL82A/R	19"	7"	*10-1/16"	22 lbs.	30 lbs.

Dimensional drawings available on request.

*Dimension to mounting surface of rack and does not include connectors. Panel is 13/32".

Construction

Heavy gauge steel cabinet hanger and chassis — hand wired for ease of maintenance — first quality resistors and capacitors utilized throughout. 19" relay rack mounting available on special order. Utilizes 7" of vertical rack space.



BLOCK DIAGRAM

CONRAC®

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CONRAC PRICE LIST

INDUSTRIAL TELEVISION EQUIPMENT

MODEL	DESCRIPTION	NET PRICE
OFF-AIR RECEIVERS		
AV12E	Basic Audio-Video Receiver (less plug-in unit)	\$ 260.00
	Plug-In Units for AV12E: SU-213 12-Channel Station Selector	60.00
	MCU Single Channel Unit (VHF only)	135.00
ERL12A	VHF Only Tuner	245.00
ERL82A	UHF Version	275.00
ERL82A/R	For Rack Mount	275.00

GENERAL PURPOSE MONITORS

CNB8/C	8" Unit in Metal Cabinet	325.00
CNB8/2R	Twin 8" Units in Mounting for 19" Rack	595.00
CNB8/N	8" Unit, Chassis only	275.00
CNB8/RBL	8" Unit in 19" Rack Mounting with Left of Front Panel Blank	320.00
CNB8/RBR	8" Unit in 19" Rack Mounting with Right of Front Panel Blank	320.00
CNB8/RXL	8" Unit in 19" Rack Mounting to Accommodate Tektronix 529 Scope Left	320.00
CNB8/RXR	8" Unit in 19" Rack Mounting to Accommodate Tektronix 529 Scope Right	320.00
CNB8/RC	Single 8" Unit Centered in Mounting for 19" Rack	340.00
CKD14	14" Unit in Metal Cabinet	345.00
CLD14	14" Unit in Mounting for 19" Rack .	335.00
CVA17/C	17" Unit in Metal Cabinet	350.00
CVA17/R	17" Unit in Mounting for 19" Rack .	340.00
CVA17/N	17" Unit, Chassis only	270.00
CVA17/Y	17" Unit in Metal Cabinet with Mounting Studs	350.00
WVA21/C	21" Unit in Metal Cabinet	390.00
WVA21/R	21" Unit in Mounting for 24" Rack .	370.00
WVA21/N	21" Unit, Chassis only	290.00
CVA23/C	23" Fully Regulated Unit in Metal Cabinet	400.00
CVA23/Y	23" Fully Regulated Unit in Metal Cabinet with Mounting Studs	400.00
CEA25/C	25" Fully Regulated Unit in Metal Cabinet	430.00
CEA25/Y	25" Fully Regulated Unit in Metal Cabinet with Mounting Studs	430.00

TRANSISTORIZED GENERAL PURPOSE MONITORS

RNC9/C	9" Unit in Metal Cabinet	\$ 445.00
RNC9/2R	Twin 9" Units in Mounting for 19" Rack	845.00
RNC9/N	9" Unit, Chassis only	405.00
RNC9/RBL	9" Unit in 19" Rack Mounting with Left of Front Panel Blank	440.00
RNC9/RBR	9" Unit in 19" Rack Mounting with Right of Front Panel Blank	440.00
RNC9/RXL	9" Unit in 19" Rack Mounting to accommodate Tektronix 529 Scope Left	440.00
RNC9/RXR	9" Unit in 19" Rack Mounting to accommodate Tektronix 529 Scope Right	440.00
RKB14	14" Unit in Metal Cabinet	465.00
RLB14	14" Unit in Mounting for 19" Rack .	455.00
RVB17/C	17" Unit in Metal Cabinet	470.00
RVB17/R	17" Unit in Mounting for 19" Rack .	460.00
RVB17 N	17" Unit, Chassis only	390.00
RVB17/Y	17" Unit in Metal Cabinet with Mounting Studs	470.00
RVB23/C	23" Fully Regulated Unit in Metal Cabinet	500.00
RVB23/Y	23" Fully Regulated Unit in Metal Cabinet with Mounting Studs	500.00

HIGH RESOLUTION MONITORS

Can be furnished on order at 875/945/1029 lines.
Other frequencies between 525 and 1225 available
on quotation only.

CQF14/C	14" Unit in Metal Cabinet	510.00
CQF14/R	14" Unit in Mounting for 19" Rack .	500.00
CQF14/N	14" Unit, Chassis only	430.00
CQF17/C	17" Unit in Metal Cabinet	515.00
CQF17/R	17" Unit in Mounting for 19" Rack .	505.00
CQF17/N	17" Unit, Chassis only	435.00
CQF17/Y	17" Unit in Metal Cabinet with Mounting Studs	515.00
CQF21/C	21" Unit in Metal Cabinet	555.00
CQF21/R	21" Unit in Mounting for 24" Rack .	535.00
CQF21/N	21" Unit, Chassis only	455.00

KINESCOPE RECORDING MONITOR

CWB10/N	10" Kinescope Recording Monitor Chassis only	900.00
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All prices include picture tube and are subject
to change without notice. Terms are 30 days net.
Shipments are F.O.B. Covina, California.
Effective: April 1, 1967

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COVINA, CALIFORNIA 91722

Continued

MODEL	DESCRIPTION	NET PRICE
ACCESSORIES		
ES23	Enclosure and Speaker for CVA23, RVB23	\$ 40.00
ES25	Enclosure and Speaker for a CEA25	40.00
M3	Three-Wheel Dolly (less pipe) used with M6 and M8 Mount to make Mobile Pedestal	60.00
M6	Pedestal Mount for 17" CVA17/Y, CQF17/Y, RVB17/Y	40.00
M7	Ceiling Mount for 17" CVA17/Y, CQF17/Y, RVB17/Y	30.00
M8	Pedestal Mount for CVA23/Y, RVB23/Y, CEA25/Y	40.00
M9	Ceiling Mount for CVA23/Y, RVB23/Y, CEA25/Y	30.00
6013	Table Mounting Kit — Contains panels and all parts necessary to make ERL12 and ERL82 into table model	15.00

CONRAC PRICE LIST

BROADCAST TELEVISION EQUIPMENT

MODEL	DESCRIPTION	NET PRICE
OFF-AIR RECEIVER		
AV12E	Basic Audio-Video Receiver (less plug-in unit)	\$ 260.00
	Plug-In Units for AV12E: SU-213 12-Channel Station Selector	60.00
	MCU Single Channel Unit (VHF only)	135.00

PROFESSIONAL MONITORS (Pulse Cross and Partial Solid State)

CZB8/C	8" Unit in Metal Cabinet	725.00
CZB8/2R	Twin 8" Units in Mounting for 19" Rack	1,395.00
CZB8/N	8" Unit, Chassis Only	675.00
CZB8/RBL	8" Unit in 19" Rack Mounting with Left of Front Panel Blank	720.00
CZB8/RBR	8" Unit in 19" Rack Mounting with Right of Front Panel Blank	720.00
CZB8/RXL	8" Unit in 19" Rack Mounting to accommodate Tektronix 529 Scope Left	720.00
CZB8/RXR	8" Unit in 19" Rack Mounting to accommodate Tektronix 529 Scope Right	720.00
CZB14/C	14" Unit in Metal Cabinet	755.00
CZB14/R	14" Unit in Mounting for 19" Rack ..	745.00
CZB14/N	14" Unit, Chassis Only	675.00
CZB17/C	17" Unit in Metal Cabinet	755.00
CZB17/R	17" Unit in Mounting for 19" Rack ..	745.00
CZB17/N	17" Unit, Chassis Only	675.00
CZB17/Y	17" Unit in Metal Cabinet with Mounting Studs	755.00

COLOR MONITORS (Encoded)

CYB17/C	17" Color Monitor in Metal Cabinet ..	2,450.00
CYB17/RS	17" Color Monitor for Mounting in 19" Rack 24" Deep with Slides ..	2,450.00
CYB17/Y	17" Color Monitor in Metal Cabinet with Mounting Studs	2,450.00
CYB21/C	21" Color Monitor in Metal Cabinet ..	2,450.00
CYB21/RS	21" Color Monitor for Mounting in 24" Rack with Slides	2,450.00
CYB21/Y	21" Color Monitor in Metal Cabinet with Mounting Studs	2,450.00

COLOR MONITORS (R, G, B, Input)

CYN17/C	17" Color Monitor in Metal Cabinet ..	2,450.00
CYN17/RS	17" Color Monitor for Mounting in 19" Rack 24" Deep with Slides ..	2,450.00
CYN21/C	21" Color Monitor in Metal Cabinet ..	2,450.00
CYN21/Y	21" Color Monitor in Metal Cabinet with Mounting Studs	2,450.00

TRANSISTORIZED GENERAL PURPOSE MONITORS

RNC9/C	9" Unit in Metal Cabinet	\$ 445.00
RNC9/2R	Twin 9" Units in Mounting for 19" Rack	845.00
RNC9/N	9" Unit, Chassis only	405.00
RNC9/RBL	9" Unit in 19" Rack Mounting with Left of Front Panel Blank	440.00
RNC9/RBR	9" Unit in 19" Rack Mounting with Right of Front Panel Blank	440.00
RNC9/RXL	9" Unit in 19" Rack Mounting to accommodate Tektronix 529 Scope Left	440.00
RNC9/RXR	9" Unit in 19" Rack Mounting to accommodate Tektronix 529 Scope Right	440.00
RKB14	14" Unit in Metal Cabinet	465.00
RLB14	14" Unit in Mounting for 19" Rack ..	455.00
RVB17/C	17" Unit in Metal Cabinet	470.00
RVB17/R	17" Unit in Mounting for 19" Rack ..	460.00
RVB17/N	17" Unit, Chassis only	390.00
RVB17/Y	17" Unit in Metal Cabinet with Mounting Studs	470.00
RVB23/C	23" Fully Regulated Unit in Metal Cabinet	500.00
RVB23/Y	23" Fully Regulated Unit in Metal Cabinet with Mounting Studs	500.00

GENERAL PURPOSE MONITORS Tube Type

CNB8/C	8" Unit in Metal Cabinet	325.00
CNB8/2R	Twin 8" Units in Mounting for 19" Rack	595.00
CNB8/N	8" Unit, Chassis only	275.00
CNB8/RBL	8" Unit in 19" Rack Mounting with Left of Front Panel Blank	320.00
CNB8/RBR	8" Unit in 19" Rack Mounting with Right of Front Panel Blank	320.00
CNB8/RXL	8" Unit in 19" Rack Mounting to Accommodate Tektronix 529 Scope Left	320.00
CNB8/RXR	8" Unit in 19" Rack Mounting to Accommodate Tektronix 529 Scope Right	320.00
CNB8/RC	Single 8" Unit Centered in Mounting for 19" Rack	340.00
CKD14	14" Unit in Metal Cabinet	345.00
CLD14	14" Unit in Mounting for 19" Rack ..	335.00
CVA17/C	17" Unit in Metal Cabinet	350.00
CVA17/R	17" Unit in Mounting for 19" Rack ..	340.00
CVA17/N	17" Unit, Chassis only	270.00
CVA17/Y	17" Unit in Metal Cabinet with Mounting Studs	350.00

Continued

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COVINA, CALIFORNIA 91722

Continued

MODEL	DESCRIPTION	NET PRICE
GENERAL PURPOSE MONITORS Tube Type		
WVA21/C	21" Unit in Metal Cabinet	\$ 390.00
WVA21/R	21" Unit in Mounting for 24" Rack .	370.00
WVA21/N	21" Unit, Chassis only	290.00
CVA23/C	23" Fully Regulated Unit in Metal Cabinet	400.00
CVA23/Y	23" Fully Regulated Unit in Metal Cabinet with Mounting Studs	400.00
CEA25/C	25" Fully Regulated Unit in Metal Cabinet	430.00
CEA25/Y	25" Fully Regulated Unit in Metal Cabinet with Mounting Studs	430.00

KINESCOPE RECORDING MONITOR

CWB10/N	10" Kinescope Recording Monitor, Chassis only	900.00
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SPECIAL PURPOSE MONITOR

 Tube Type

CTB8/XU	8" Unit with Scope Housing for 13" Console Mount	430.00
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ACCESSORIES

ES23	Enclosure and Speaker for CVA23, RVB23	40.00
ES25	Enclosure and Speaker for a CEA25	40.00
M3	Three-Wheel Dolly (less pipe) used with M6 and M8 Mount to make Mobile Pedestal	60.00
M4	Pedestal Mount for CYB17/Y	40.00
M5	Ceiling Mount for CYB17/Y	30.00
M6	Pedestal Mount for 17" CZB17/Y, CVA17/Y, RVB17/Y	40.00
M7	Ceiling Mount for 17" CZB17/Y, CVA17/Y, RVB17/Y	30.00
M8	Pedestal Mount for CVA23/Y, RVB23/Y, CEA25/Y, CYN21/Y, CYB21/Y	40.00
M9	Ceiling Mount for CVA23/Y, RVB23/Y, CEA25/Y, CYN21/Y, CYB21/Y	30.00

WARRANTY

CONRAC CORPORATION warrants each new broadcast and industrial product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to us or to our authorized dealer or wholesaler from whom purchased, intact, for our examination, with all transportation charges prepaid to our factory, within one year from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio and television products.



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